EMPOWERING ELEMENTARY TEACHERS IN TEXAS TO PREPARE THEIR STUDENTS FOR THE SCIENCE SECTION OF THE TEXAS ASSESSMENT OF KNOWLEDGE AND SKILLS (TAKS) 2003

A Thesis

by

SCOTT ALEXANDER BLACKMON

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

August 2003

Major Subject: Wildlife and Fisheries Sciences

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Approved as to style and content by:

Clark E. Adams (Chair of Committee)	Keith Arnold (Member)
Tim H. Murphy (Member)	Robert D. Brown (Head of Department)

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ABSTRACT

Empowering Elementary Teachers in Texas to Prepare Their Students for the Science Section of the Texas Assessment of Knowledge and Skills (TAKS) 2003. (August 2003)

Scott Alexander Blackmon, B.S., Texas A&M University

Chair of Advisory Committee: Dr. Clark E. Adams

The need for an effective means of enhancing the science comprehension of elementary teachers brought about changes in the Texas Assessment of Knowledge and Skills (TAKS) exit exam for 5th grade students. The overall goal of this project was to evaluate the effectiveness of an alternative method of science instruction to train pre-service teachers.

Web-based instructional designs are emerging as an alternative medium for disseminating course content in continuing education. A need exists to reach a point where web-based materials can be evaluated in terms of achieving desired teaching and learning outcomes, e.g., course grade, professional development certification, skills development and application of course content.

The course offered to pre-service teachers provided the opportunity to build their confidence in teaching science and knowledge of subject matter using a combination of traditional and web-based instructional components. The entire course including lessons, exams, and ancillary materials were included in a WebCt distance education platform at Texas A&M University, for pre-service teachers to access online. During the course of the semester students took six exams which determined their overall grade in the course.

Study objectives were measured using students enrolled in WFSC 420 Ecology for Teachers during the Fall 2002 and Spring 2003 semesters. The four required assessments were administered before the first exam and after the fifth exam. Analysis of pre- vs. post-course assessments was conducted using paired t-test analysis of mean scores on two assessments including the Science Teaching Efficacy Beliefs Instrument and traditional versus web-based instruction. Student scores on the TAKS test were compared using raw average scores pre- and post-course. Additionally, each student's final course grade was correlated to the final TAKS score to determine the level of score consistency.

WFSC 420 Ecology for Teachers prepared pre-service teacher trainees to teach elementary science in two ways. First it provided the relevant science content necessary for teachers to adequately prepare their students for the TAKS exam. Secondly, it has been shown to improve students' confidence in their ability to teach science. Both of these provide a firm foundation to properly educate elementary science teachers for the future.

DEDICATION

This thesis is dedicated to my wife, Emily Blackmon, for her constant perseverance with me through thick and thin, and to my parents, Larry and Cheryl Blackmon, for their constant support in all my academic endeavors.

ACKNOWLEDGEMENTS

Most importantly, I would like to acknowledge Dr. Clark E. Adams for his outstanding support and guidance. This project would not have been a success without his knowledge and skills. I greatly appreciate his diligence and hard work in helping me through this project with minimal complaint.

I also appreciated the advice and unique views of the other members of my committee. Dr. Keith Arnold and Dr. Tim Murphy provided various ways to improve upon the manuscript, and were always available to help with even the smallest of details.

Last but certainly not least, I would like to acknowledge Emily Blackmon for her outstanding support and for her typing abilities. Without her skills this project would not have gone as smoothly as it did.

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CHAPTER I

INTRODUCTION

The need for an effective means of enhancing the science content of elementary (e.g., 5th grade) teachers brought about changes in the Texas Assessment of Knowledge and Skills (TAKS) exit exam for 5th grade students. The new version of the TAKS exit exam included a science section in 2003. However, the majority of 5th grade teachers are not adequately prepared to teach the science concepts required for their students to pass the science section of the exit exam. This project offered a web-based version of the WFSC 420 Ecology for Teachers taught through the Department of Wildlife and Fisheries Sciences at Texas A&M University. This course was offered to pre-service elementary teachers who were predominately resident (98%) students at Texas A&M.

The overall goal of this project was to evaluate the effectiveness of an alternative method of science instruction to train pre-service teachers. The study objectives focused on three areas of investigation including:

1. Use and acceptance of web-based materials when compared to traditional course materials,
2. mastery of the science concepts listed in the TAKS assessment, and

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The format of this thesis follows that used in the NACTA Journal.

3. confidence (science-teaching self efficacy) in teachers ability to teach the science concepts required for their students to pass the science section of TAKS.

CHAPTER II

LITERATURE REVIEW

Online instruction

Web-based instructional designs are emerging as an alternative medium for disseminating course content in continuing education. The variations in designs are a product of the types of courses taught, who taught them and the student audience. Since web-based instruction is a relatively new approach to continuing education, most users are in the initial stages of understanding the various software platforms that organize course content and allow delivery to student populations. Most research on the effectiveness of web-based instruction has focused on student use, satisfaction and opinions (Herring et al. 2001). Early research on web-based, distance learning, and other technology-assisted learning venues indicated mixed results. Experiences such as learning sequences or use of particular aspects of available electronic programs appear to be viewed positively by learners (e.g., Graham, Seabrook, & Woodfield, 1999;Yang, 2000). In a comparison of web-based and traditional teaching methods in one undergraduate course, Hurlburt (2001) found no difference in overall student performance. He did find that while students preferred the convenience of Web instruction, overall they preferred the traditional classroom.

A need exists to reach a point where web-based materials can be evaluated in terms of achieving desired teaching and learning outcomes, e.g., course grade, professional development certification, skills development and application of course content. In addition, understanding how well web-based instruction is accepted will also

be informative. Acceptance research in general examines whether consumers perceive interventions as fair, appropriate, and reasonable (Eckert & Shapiro, 1999). One general finding is that if the consumer perceives an intervention as unacceptable, that particular intervention may be less likely to be used, regardless of effectiveness (Gajria & Salend, 1996; Allinder & Oats, 1997). Boling and Robinson (1999) noted that there has been little theoretical or empirical evaluation of the media and methods developed to present distance-education material. Hurlburt (2001) stated that little evidence existed on how to create entire distance-education courses or how to create effective distance-learning enhancement for students in traditional classes. Benigo and Trentin (2000) suggested a need for more research, particularly in the area of learner characteristics and methodology reactions. This study provided the opportunity to examine effectiveness of web-based course delivery while improving the self-efficacy of elementary science teachers.

Content mastery

The literature on how increased conceptual knowledge in science affects teaching self-efficacy is contradictory. For example, Stevens and Wenner (1996) found no significant relationship between subject-matter knowledge and willingness to teach. Their findings contradicted those of Westerback and Long (1990), who showed that increased content knowledge, given through science and mathematics courses designed for experienced elementary teachers, can reduce teacher's anxiety about teaching science and math. It has long been known that a science course that is aligned with teaching skills development, societal relevancy, and science curriculum standards and frameworks, e.g., TAKS Objectives and Student Expectations (Appendix A), will enhance science teaching abilities (McDevitt et al. 1993).

The course of study used in this research project was designed to assist teachers as they: (1) establish a learning environment that awakens students' curiosity of the world they live in, (2) stimulate students' desire to expand their knowledge about how the world works, (3) give students the opportunity to measure their growth in knowledge (content) and understanding (application of content) and (4) challenge students to translate their new knowledge and understanding into personal actions and self-realizations.

The specific teaching goals for WFSC 420 Ecology for Teachers are to give classroom teachers the opportunity to: (1) use the symbolic tools of thinking, communicating and inquiring about environmental science; (2) synthesize and interpret basic facts about the human and natural ecosystems using a diversity, interrelationships, cycles and energy (DICE) conceptual organization; (3) organize information about ecosystems based on a conceptual framework of established ecological principles, human cultural development, and economic and social trends; and (4) evaluate consistency and reasonableness in their decisions and judgments about hypothetical or simulated interactions between humans and natural ecosystems.

Teacher confidence

Science teaching self-efficacy is the belief or confidence that a teacher has the ability to teach science effectively (Gassert and Shroyer 1992). These researchers also listed several references about elementary teachers' negative attitudes toward science as well as their science teaching anxiety. Gassert and Shroyer (1992) state that "the subject-specific aspect of teaching self-efficacy makes the study of personal science teaching self-efficacy, or the belief of a teacher concerning his / her ability to perform appropriate teaching behaviors and effectively teach science, a timely and relevant

research topic." In Texas, this is a particularly relevant statement given the changes in the state mandated TAKS examination which included a science section for 5th grade students in 2003. Riggs and Enochs (1990:627) believed that "a specific measure of science teaching efficacy beliefs should be a more accurate predictor of science teaching behavior and thus more beneficial to the change process necessary to improve students' science achievement." They developed the Science Teaching Efficacy Beliefs Instrument (STEBI). It is a valid and reliable tool for studying elementary teacher's beliefs towards science teaching and learning. The STEBI has been used by other researchers since its development to show relations between science teaching efficacy and other factors (Schoon and Boone, 1998).

Hypothesis

Exposure to class materials and lectures, as described above, was the experimental treatment in this study. It was therefore expected that student performance on the four surveys will change as a result of exposure to class materials and lectures. For example, pre- and post-score comparisons should demonstrate change in student confidence in teaching science; use and acceptability of web-based instruction, and content mastery.

The null hypotheses to be tested in this study are stated as follow.

H_{01}: Students' use and acceptance of web-based instructional materials will not change.

H_{02}: Students' content mastery will not change.

H_{03}: Students' confidence in teaching science will not change.

CHAPTER III

METHODS

Course procedures

The course offered to pre-service teachers provided the opportunity to build their confidence in teaching science and knowledge of subject matter using a combination of traditional and web-based instructional components. The traditional components were a text and a study guide to accompany the text written by Dr. Clark E. Adams (Wildlife and Fisheries Sciences). The development of the web-based instructional components was a Draconian task that involved collaborative relationships with mass communication and distance education specialists. For example, KAMU TV personnel and Dr. Adams produced 21 televised lessons in January and February 2002 which became the streaming video lectures for teachers to access online. An alternative lecture format was also provided through 21 voice-over Microsoft Power Point lectures for teacher access online. Dr. Adams also produced the voice-over Microsoft Power Point lectures. Both the streaming video and voice-over Microsoft Power Point lecture formats were provided in cd-rom formats for those teachers who did not have access to cable internet modems. Cd-rom versions of the lessons were made available to those students who requested them. Lecture and Microsoft Power Point notes were made available online in PDF format. The entire course including lessons, exams, and ancillary materials were included in a WebCt distance education platform at Texas A&M University, for pre-service teachers to access online. During the course of the semester students took six exams which determined their overall grade in the course.

Sample student population

Study objectives were measured using students enrolled in WFSC 420 Ecology for Teachers during the Fall 2002 and Spring 2003 semesters. Each class contained approximately 125 students. The class consisted primarily (95%) of white female students, 18 years of age or older, who were juniors or seniors. The majority of student in the class were pre-service elementary teacher trainees in the College of Education.

Survey used

Students' acceptance of web-based instruction materials

Use of web based material was measured using an assessment created by Dr. Adams (Appendix B). The assessment measured class and course design, website use, traditional material use, teaching status, technology available to the student, and reasons for decline in web use over the course of the semester.

Student use of web-based vs. traditional course materials

One objective of this study was to examine how to best utilize web-based media as a supplement to traditional classroom teaching (Appendix C). The survey addressed the following questions.

- How does the use of web-based and/or traditional course materials (dependent variables) contribute to teacher knowledge and performance on course exams (independent variables)?
- Is there a measurable attitudinal change in teacher acceptance and use of web-based instruction?

Assessment procedures were already in place and tested. During the second summer session 2001, Dr. Adams (Wildlife and Fisheries Sciences), Dr. Connie Fournier (Educational Psychology) and Dr. Nancy Simpson (Director, Center for

Teaching Excellence) developed pre- and post-course assessment procedures that compared the effectiveness of web-based and traditional course materials in achieving instructor teaching (content delivery) and student learning (content mastery) objectives. The assessments were pre-tested on 10 in service teachers and 18 undergraduate students enrolled in WFSC 420 Ecology for Teachers during the summer session 2002.

Students' content mastery

Pre-service teacher assessment of knowledge in those areas of the WFSC 420 course content with special reference to TAKS objectives and student expectations were conducted before and after course content was presented. This assessment consisted of a selection of 50 items from the 8th grade TAKS science test (Appendix D). Test items measured knowledge and application of science content that correlated with the TAKS objectives and student expectations (Appendix A). There was opportunity to examine relationships between content knowledge and the STEBI assessment discussed below.

Students' confidence in science instruction

The STEBI assessment of Riggs and Enochs (1990) is a valid and reliable tool for studying elementary teacher's beliefs towards science teaching and learning (Appendix E). The scale modification suggested by Schoon and Boone (1998) was used, but the method of data analysis that produced a science teaching self-efficacy score was according to Riggs and Enochs (1990).

Survey administration

The four required assessments (Appendix B, C, D, and E) were administered before the first exam and after the fifth exam. Course exposure was completed by the students enrolled in WFSC 420 during the two semester indicated above. The research

design and population was approved by the Institutional Review Board – Human Subjects in Research, Texas A&M University (TAMU # 2002 - 491).

Data analysis

Analysis of pre- vs. post- course assessments was conducted using paired t-test analysis of mean scores on two assessments including the STEBI and traditional verses web-based instruction. Student scores on the TAKS test were compared using raw average scores pre- and post- course. Additionally, each student's final course grade was correlated to the final TAKS score to determine the level of score consistency.

CHAPTER IV

RESULTS

Students' acceptance of web-based instruction materials

The WebCt program provides a tracking method whereby a distance education instructor can monitor how many times each student accessed the web site for any of the online components. The pattern of student use of web-based instructional materials enrolled in WFSC 420 Ecology for Teachers showed a rapid decline from lesson 1 to lesson 21(Figure 1).

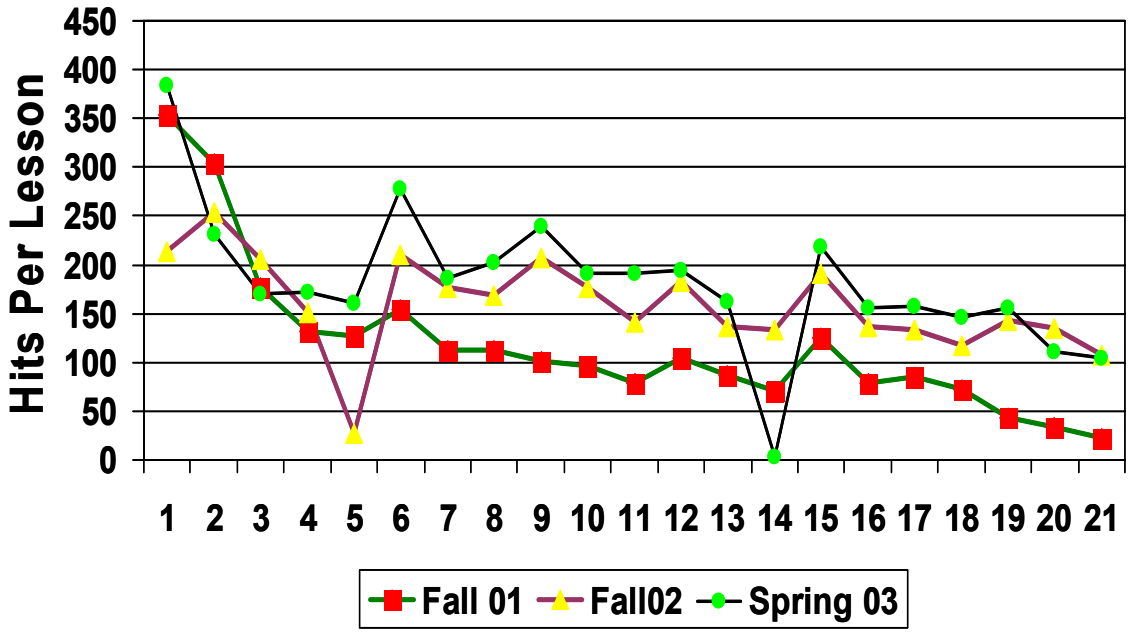

Figure 1. Student use of Web-based materials: Fall 2001 and 2002 and Spring 2003.

Students were asked to explain these findings in a post-course survey. The majority of students said that they did not need the web-based lectures because everything they needed to know for the exams was covered in the text and study guide. Students used the textbook and study guide far more than web-based instructional materials (Figure 2a and b).

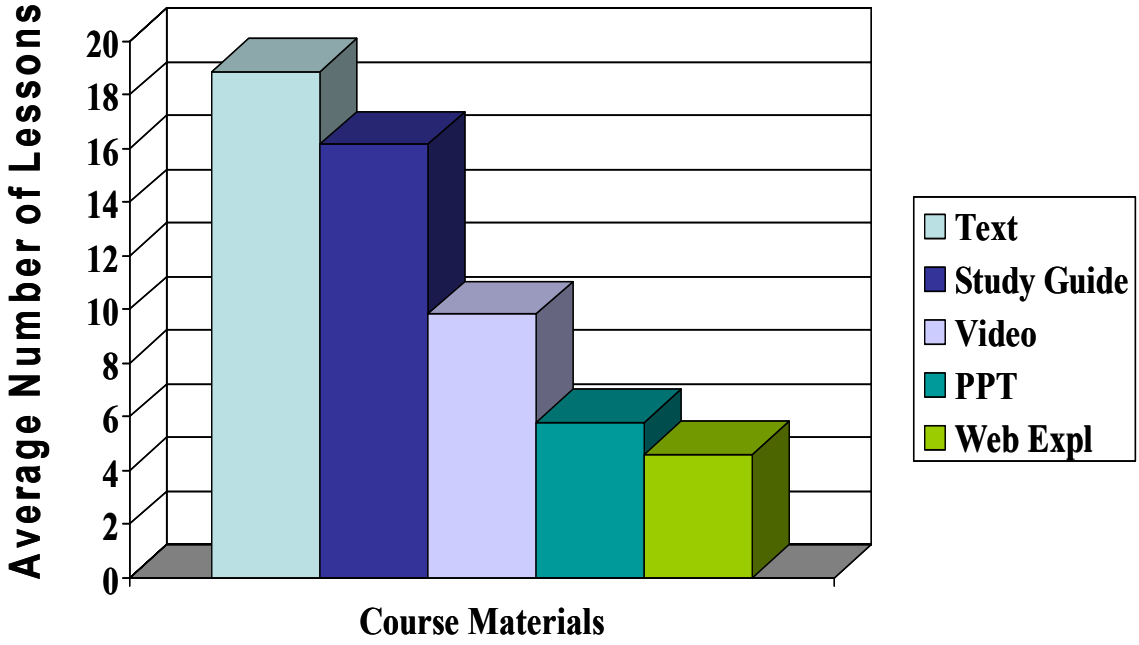

Figure 2a. Average use of class materials to prepare for chapter exams by WFSC 420 students (N = 103) for the Fall 2002 semester.

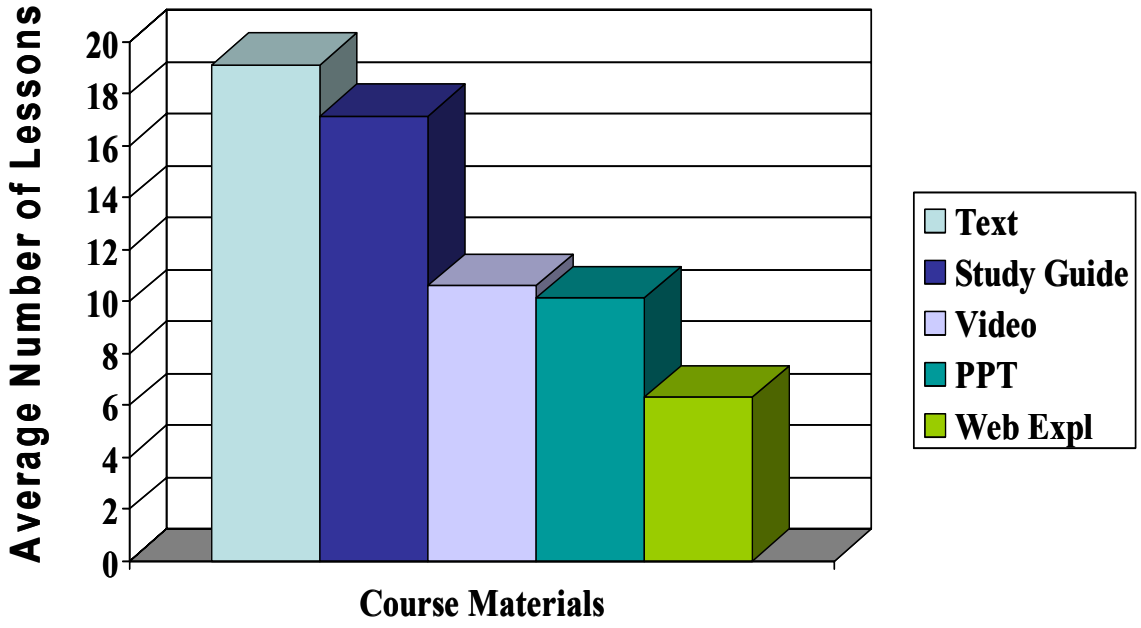

Figure 2b. Average use of class materials to prepare for chapter exams by WFSC 420 students (N = 103) for the Spring 2003 semester.

Students' comments on the use of web-based materials varied slightly from Fall 2002 to Spring 2003 (Appendix F & Appendix G). For example, in the Fall 2002 semester, 55.8 percent said the book was more useful to prepare for tests while 14.7 percent said time was the major reason for the decline in web use. Of the remaining students, 10.5 percent expressed other reasons and 14.7 percent expressed positive reactions, stating that they did not know why the decline occurred, due to the fact that they use the web all the time. Only 4.2 percent of students gave no response.

In Spring of 2003 comments, 33.3 percent said that the book was more useful and 25.4 percent said time was the major reason for web use decline. Still another 27.2 percent expressed other reasons for web decline, i.e., tests tied closely to text and

study guide, hardware difficulties. Another 11.4 percent noted positive comments, and 2.6 percent gave no response.

Students' end-of-the-year comments followed a similar pattern for both Fall 2002 and Spring 2003 (Appendix H & Appendix I). In the Fall of 2002 comments, 29.5 percent of students liked for the course and/or course delivery methods while 21.1 percent of students did not like the course and 15.8 percent had other various comments about course procedures and miscellaneous items. Over one third of the students had no comment.

In the Spring of 2003 semester, 36.8 percent of students liked the course while 12.3 percent did not. The remaining 18.4 percent of students had other miscellaneous comments and 32.5 percent had no comment.

Student use of web-based vs. traditional course materials

At the end of the course for both the Fall 2002 and Spring 2003 semesters, students tended to favor ($P < 0.05$, paired t-test of mean scores) the traditional class format when responding to the following statements:

1. "The material is covered more clearly in this format".
2. "I learn material better this way".
3. "The pace is appropriate (neither too fast or too slow)".
4. "I feel more involved with the material".
5. " Overall, I would prefer courses to be taught this way".

There was no change in their perceptions of which method of instruction was more convenient. However, in the post course survey, 60% of the Fall 2002 and 66% of the Spring 2003 students said they would enroll in a web-based course the next semester.

Students' content mastery

The overall class score on a TAKS science exam similar to the one given to 8th grade students in Texas public schools was 57% on the pretest and 76% on the post test for the Fall 2002 students compared to 74% and 80%, respectively, for the Spring 2003 students. It is unknown why the Spring 2003 students scored higher ($P<0.05$) on the pre-TAKS exam than the Fall 2002 students. Low but significant ($P < 0.01$) Pearson correlations of post-TAKS scores and student grade in the class exist for both the Fall 2002 ($r = 0.416$, $N = 104$) and Spring 2003 ($r = .390$, $N = 112$) semester students.

Students' confidence in science instruction

One of the crowning achievements in the conduct of this study was a significant improvement in students' confidence in their ability to teach science (Table 1). The STEBI developed by Riggs and Enochs (1990) examined science efficacy (SE) and outcome expectancy (OE). There were significant differences in the pre- and post-course measures of SE during the Fall 2002 and Spring 2003 semesters (Table 1). This was not the case for the OE scores. A paired t-test analysis of mean scores for each SE statement revealed significant ($P < 0.0001$) positive growth on all 13 statements, i.e., 2, 3, 5, 6, 8, 12, 17, 18, 19, 21, 22, 23, and 24 in the Fall 2002 and all statements except 3, 21, and 23 in the Spring 2003.

Table 1. Pre- and post-course paired t-test MEAN SCORE comparisons of students' confidence in their ability to teach science during the Fall 2002 (N = 103) and Spring 2003 (N = 111) semesters.

TEST	FALL 2002	SPRING 2003
PRESE	52.68	51.78
PSTSE [+]	58.84	58.85
PREOE	49.80	51.87
PSTOE	50.12 [++]	51.20

[+] = paired t-test significant at $P < 0.0001$ during both semesters

[++] = paired t-test significant at $P = 0.02$

CHAPTER V

CONCLUSION

Several constraints must be considered when conducting unbiased class assessments. The first was the lack of student reward for participation in the surveys. Without some form of reward or penalty system, most students do not take the activity seriously. The second was students' overall drive and motivation in the course was their grade. This became even more evident with their course comments that found the book and study guide the easiest way to prepare for tests. Students appeared to have little desire to develop career skills to help them become more effective science teachers. This was demonstrated by their low use of the web-based lectures which gave them guidance in teaching the lesson concepts. Finally, there was a lack of control groups within this study due to the design and layout of the course infrastructure, the fact that all of the students were taking this course for a grade, and the difficulty of establishing a group that was only provided the surveys and tests and not the course content.

With web-based instructional design, there was a loss in some of the pedagogy benefits that go along with the traditional classroom setting. The first and most sought after loss was that of student/teacher contact. Most students felt that they were forced to sit in front of a one way informational system that did not allow them the benefit of easily asking questions about various course content. Along the same lines was the loss of face-to-face discourse. Many students liked the idea of looking at a live instructor rather than one that has been pre-recorded. The biggest loss to an instructor

was that of not being able to pick up on non-verbal cues that students in a classroom project when material is being presented. All of these appeared to be major drawbacks to the web-based instructional design.

Students' acceptance of web-based instruction materials

After comparing the pre and post course surveys on the acceptance of web-based instruction (Appendix C), students were significantly less accepting of web-based instruction. These students also expressed that they were less likely to use web-based technology as an instructional option in their own lesson plans. This finding agreed in part with those of Hurlburt (2001). The only question that students had no particular preference for dealt with the convenience of course format. In spite of these findings, over 60% of the students said they would sign up for another web-based course next semester.

Student use of web-based vs. traditional course materials

Students tended to favor traditional course materials over web-based. Over 70% of students in Fall 2002 said that either the book and study guide or time was the biggest reason for them not to use web-based tools. This was followed in the Spring 2003 with 58.7% of students expressing the same opinion. In contrast, only 21.1% in the Fall 2002 and 12.3% in the Spring 2003 expressed dislike for the web-based teaching format.

This was a particularly disturbing finding for two reasons. First, a great deal of time, money and professional expertise went into the development of the class lectures for online delivery. Second, the lectures were designed to assist teachers to: (1) establish a learning environment that awakens their students' curiosity about the world they live in, (2) stimulate their students' desire to expand their knowledge about how the

world works, (3) give their students the opportunity to grow in knowledge (content) and understanding (application of content), and (4) challenge their students to translate their new knowledge and understanding into personal actions and self-realizations. In addition, each lecture contained activity suggestions for teaching course content and correlations of lesson content with the TAKS objectives and student expectations in science provided in Appendix A and the web site listed below (http://www.tea.state.tx.us/student.assessment/taks/booklets/science/gr5.pdf). The web-based lectures were designed to be the professional development component of the class. However, it appeared that course participants were more focused on a class grade rather than a life-long learning or professional growth opportunity.

Students' content mastery

The Pearson correlation indicated a low correlation between the post-TAKS and students course grade. These data may reveal one of the major obstacles in conducting classroom assessments of instructional goals and/or objectives. Completion of the TAKS science test was a non-optional class requirement. It was possible that the students were not inclined to respond as accurately to the TAKS science test as they would a class test because there was no grade or reward of any kind attached to the former test. Another possibility could be that the course (WFSC 420) inadequately prepared teachers to perform well on the TAKS exam. However, the second explanation is tempered due to the course design that so closely follows the TAKS guidelines (Appendix I).

Students' confidence in science instruction

There was a significant increase in pre-service teachers own ability to teach science concepts (self-efficacy) noted for both the Fall 2002 and Spring 2003

semesters. However, pre-service teachers expectation of certain teaching concepts to produce desirable outcomes (outcome expectancy) was less than expected with only a slight increase in the Fall 2002 (significant at P=0.02), and no increase in the spring 2003 semester. It was possible that the outcome expectancy scores were related to in class teaching experience which few of the students had. The course was designed to train pre-service teachers to teach science concepts to elementary students. Students were most confident in knowing the steps necessary to teach science effectively and perceiving personal effectiveness as science teachers.

WFSC 420 Ecology for Teachers prepared pre-service teacher trainees to teach elementary science in two ways. First it provided the relevant science content necessary for teachers to adequately prepare their students for the TAKS exam. Secondly, it has been shown to improve students' confidence in their ability to teach science. Both of these provide a firm foundation to properly educate elementary science teachers for the future.

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APPENDIX A

TAAS II Objectives and TEKS Student Expectations

Elementary Science Grade 5

TAAS II Objective 1

The student will demonstrate an understanding of the nature of science.

(3.1, 4.1, 5.1) Scientific processes. The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices. The student is expected to

(A) demonstrate safe practices during field and laboratory investigations.

(5.2) Scientific processes. The student uses scientific methods during field and laboratory investigations. The student is expected to

(A) plan and implement descriptive and simple experimental investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology;

(B) collect information by observing and measuring;

(C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence;

(D) communicate valid conclusions; and

(E) construct simple graphs, tables, maps, and charts using tools [including computers] to organize, examine, and evaluate information.

(3.3, 4.3, 5.3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to

(A) analyze, review, [and critique] scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;

(B) draw inferences based on information [related to promotional materials] for products and services; and

(C) represent the natural world using models and identify their limitations.

(5.4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry. The student is expected to

(A) collect and analyze information using tools including calculators, microscopes, [cameras, sound recorders, computers,] hand lenses, rulers, thermometers, compasses, balances, [hot plates,] meter sticks, timing devices, magnets, collecting nets, and safety goggles.

TAAS II Objective 2

The student will demonstrate an understanding of the life sciences.

(5.10) Science concepts. The student knows that likenesses between offspring and parents can be inherited or learned. The student is expected to

(A) identify traits that are inherited from parent to offspring in plants and animals; and

(B) give examples of learned characteristics that result from the influence of the environment.

(5.9) Science concepts. The student knows that adaptations may increase the survival of members of a species. The student is expected to

(A) compare the adaptive characteristics of species that improve their ability to survive and reproduce in an ecosystem;

(B) analyze and describe adaptive characteristics that result in an organism's unique niche in an ecosystem; and

(C) predict some adaptive characteristics required for survival and reproduction by an organism in an ecosystem.

(5.6) Science concepts. The student know that some change occurs in cycles. The student is expected to

(C) describe an compare life cycles of plants and animals.

(3.8) Science concepts. The student knows that living organisms need food, water, light, air, a way to dispose of waste, and an environment in which to live. The student is expected to

(A) observe and describe the habitats of organisms within an ecosystem;

(B) observe and identify organisms with similar needs that compete with one another for resources such as oxygen, water, food, or space;

(C) describe environmental changes in which some organisms would thrive, become ill, or perish; and

(D) describe how living organisms modify their physical environment to meet their needs such as beavers building a dam or humans building a home.

(2.9) Science concepts. The student knows that living organisms have basic needs. The student is expected to

(A) identify the external characteristics of different kinds of plants and animals that allow their needs to be met; and

(B) compare and give examples of the ways living organisms depend on each other and on their environments.

(5.5) Science concepts. The student knows that a system is a collection of cycles, structures, and processes that interact. The student is expected to

(A) describe some cycles, structures, and processes that are found in a simple system; and

(B) describe some interactions that occur in a simple system.

(4.6) Science concepts. The student knows that change can create recognizable patterns. The student is expected to

(A) identify patterns of change such as in weather, metamorphosis, and objects in the sky.

TAAS II Objective 3

The student will demonstrate an understanding of the physical sciences.

(5.8) Science concepts. The student knows that energy occurs in many forms. The student is expected to

(A) differentiate among forms of energy including light, heat, electrical, and solar energy;

(B) identify and demonstrate everyday examples of how light is reflected, such as from tinted windows, and refracted, such as in cameras, telescopes, and eyeglasses;

(C) demonstrate that electricity can flow in a circuit and can produce heat, light, sound, and magnetic effects; and

(D) verify that vibrating an object can produce sound.

(5.7) Science concepts. The student knows that matter has physical properties. The student is expected to

(A) classify matter based on its physical properties including magnetism, physical state, and the ability to conduct or insulate heat, electricity, and sound;

(B) demonstrate that some mixtures maintain the physical properties of their ingredients;

(C) identify changes that can occur in the physical properties of the ingredients of solutions such as dissolving sugar in water; and

(D) observe and measure characteristic properties of substances that remain constant such as boiling points and melting points.

(3.6) Science concepts. The student knows that forces cause change. The student is expected to

(A) measure and record changes in the position and direction of the motion of an object to which a force such as a push or pull has been applied.

(5.5) Science concepts. The student knows that a system is a collection of cycles, structures, and processes that interact. The student is expected to

(A) describe some cycles, structures, and processes that are found in a simple system; and

(B) describe some interactions that occur in a simple system.

(4.5) Science concepts. The student know that change can create recognizable patterns. The student is expected to

(A) identify patterns of change such as in weather, metamorphosis, and objects in the sky.

TAAS II Objective 4

The student will demonstrate an understanding of earth sciences.

(5.12) Science concepts. The student knows that the natural world includes earth materials and objects in the sky. The student is expected to

(A) interpret how land forms are the result of a combination of constructive and destructive forces such as deposition of sediment and weathering; and

(C) identify the physical characteristics of the Earth and compare them to the physical characteristics of the moon.

(5.11) Science concepts. The student knows that certain past events affect present and future events. The student is expected to

(A) identify and observe actions that require time for changes to be measurable, including growth, erosion, dissolving, weathering, and flow;

(B) draw conclusions about "what happened before" using data such as from tree-growth rings and sedimentary rock sequences; and

(C) identify past events that led to the formation of the Earth's renewable, non-renewable, and inexhaustible resources.

(5.6) Science concepts. The student knows that some change occurs in cycles. The student is expected to

(A) identify events an describe changes that occur on a regular basis such as in daily, weekly, lunar, and seasonal cycles; and

(B) identify the significance of the water, carbon, and nitrogen cycles.

(4.11) Science concepts. The student knows that the natural world includes earth materials and objects in the sky. The student is expected to

(A) test properties of soil including texture, capacity to retain water, and ability to support life;

(B) summarize the effects of the oceans on land; and

(C) identify the Sun as the major source of energy for the Earth and understand its role in the growth of plants, in the creation of winds, and in the water cycle.

(3.11) Science concepts. The student knows that the natural world includes earth materials and objects in the sky. The student is expected to

(A) identify and describe the importance of earth materials including rocks, soil, water, and gases of the atmosphere in the local area and classify them as renewable, nonrenewable, or inexhaustible resources;

(C) identify the planets in our solar system and their position in relation to the Sun; and

(D) describe the characteristics of the Sun.

(3.6) Science concepts. The student knows that forces cause change. The student is expected to

(B) identify that the surface of the Earth can be changed by forces such as earthquakes and glaciers.

(5.5) Science concepts. The student knows that a system is a collection of cycles, structures, and processes that interact. The student is expected to

(A) describe some cycles, structures, and processes that are found in a simple system; and

(B) describe some interactions that occur in a simples system.

(4.6) Science concepts. The student knows that change can create recognizable patterns. The student is expected to

(A) identify patterns of change such as in weather, metamorphosis, and objects in the sky.

APPENDIX B

End of the Year Survey

This survey was designed for our web-based students to provide us with feedback on the course webpage and their experience with learning on-line. Your answers to this survey will be completely anonymous. That means that no one can associate you with your answers. So, please feel free to respond as you would like and be candid with us in the open-ended questions at the end of the survey. Your responses will be grouped with others in the class and submitted to the Distance Education Coordinators at Texas A&M University for assessment purposes. Thank you for your input. Have a great summer break!!

Question 1
I felt like part of a class (NOT isolated and alone -- cut off from the instructor and other students).

1. Strongly Agree
2. Agree
3. Undecided
4. Disagree
5. Strongly Disagree

Question 2
The instructor was aware of the unique needs of distance learners and planned accordingly.

1. Strongly Agree
2. Agree
3. Undecided
4. Disagree
5. Strongly Disagree

Question 3
The instructor responded in a timely fashion when contacted.

1. Strongly Agree
2. Agree
3. Undecided
4. Disagree
5. Strongly Disagree

Question 4
The course website contributed to the quality of the class.

1. Strongly Agree
2. Agree
3. Do not know - rarely used the website
4. Disagree

5. Strongly Disagree

Question 5
Sufficient opportunities for interaction with the instructor were provided on the website.

1. Strongly Agree
2. Agree
3. Do not know - rarely used the website
4. Disagree
5. Strongly Disagree

Question 6
Sufficient opportunities for interaction with the other students were provided on the website.

1. Strongly Agree
2. Agree
3. Do not know - rarely used the website
4. Disagree
5. Strongly Disagree

Question 7
The course website provided opportunities for additional course-related research and discovery.

1. Strongly Agree
2. Agree
3. Do not know - rarely used the website
4. Disagree
5. Strongly Disagree

Question 8
I could find information I was expected to find using the course website.

1. Strongly Agree
2. Agree
3. Do not know - rarely used the website
4. Disagree
5. Strongly Disagree

Question 9
The materials on the course website were of high quality.

1. Strongly Agree
2. Agree
3. Do not know - rarely used the website
4. Disagree
5. Strongly Disagree

Question 10
The course website was well organized.

1. Strongly Agree
2. Agree
3. Do not know - rarely used the website
4. Disagree
5. Strongly Disagree

Question 11
The course website was complete.

1. Strongly Agree
2. Agree
3. Do not know - rarely used the website
4. Disagree
5. Strongly Disagree

Question 12
The course website was consistently updated and current.

1. Strongly Agree
2. Agree
3. Do not know - rarely used the website
4. Disagree
5. Strongly Disagree

Question 13
The course website was visually appealing.

1. Strongly Agree
2. Agree
3. Do not know - rarely used the website
4. Disagree
5. Strongly Disagree

Question 14
How would you rate the quality of the live or archived streaming video?

1. Outstanding
2. Very Good
3. Average
4. Below Average
5. Did not use the streaming videos enough to be able to rate their quality.

Question 15
How would you rate the quality of the voice-over powerpoint presentations?

1. Outstanding
2. Very Good
3. Average
4. Below Average
5. Did not use the voice-over powerpoint presentations enough to be able to rate their quality.

Question 16
How would you rate the quality of the Adobe Acrobat Powerpoint Notes that you could print off before going to class, or viewing the streaming video and powerpoint presentation?

1. Outstanding
2. Very Good
3. Average
4. Below Average
5. Did not use the adobe acrobat power point notes enough to be able to rate their quality.

Question 17
For how many lessons (1 to 21) did you use the following course materials to prepare for exams?
Text book
Study guide
Voice-over power point lectures on webct
Steaming video lectures
Power point lecture notes
Web explorations
Web hyperlinks
Voice-over power point lectures on cd-rom discs

Question 18
Before taking each of the six exams, how confident were you that you were prepared to do well on each?
Exam 1
Exam 2
Exam 3
Exam 4
Exam 5
Exam 6

Question 19
At the time you took WFSC 420, were you actively involved in the teaching profession?

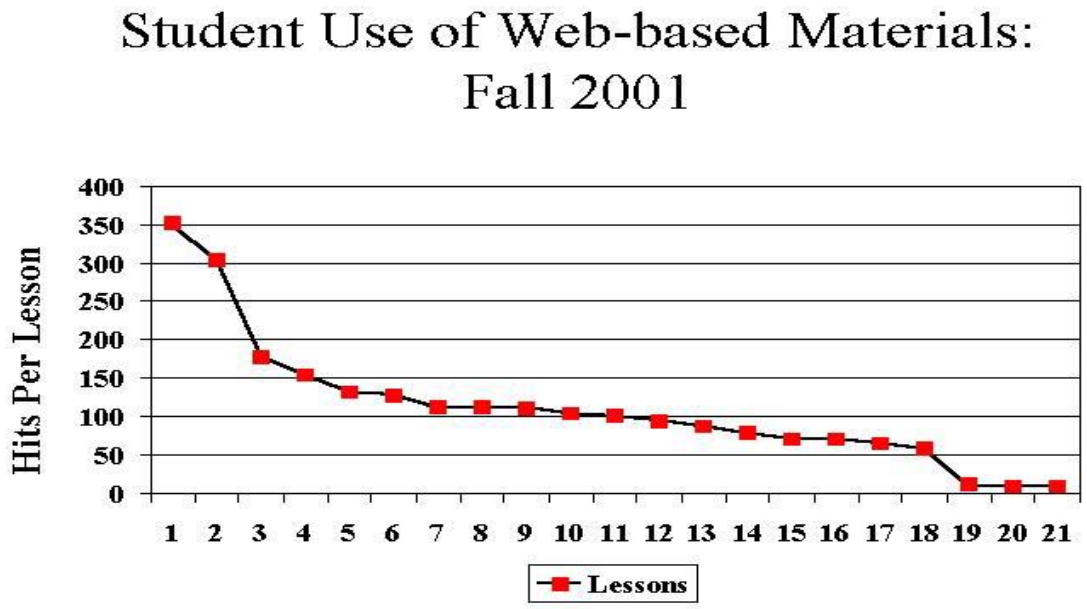
1. Yes
2. No

Question 20
Would you sign up for an all web-based course next semester?

1. Yes
2. No

Question 21
What type of computer did you use most often when viewing the course webpage (example, Pentium III @ 166 megahertz) and what was the speed of your modem, (example, 56.6 K modem)?

Question 22
The graph below shows a dramatic decrease in student use of web-based materials from lesson 1 to 21. Please provide your explanation of this decline in terms of the contribution of these materials in helping you learn the course content? Your answer will be treated with extreme confidentiality and you will not be associated with your answer



Question 23
Is there anything else that you would like to share with us about the class?

APPENDIX C

Traditional and Web-based Teaching Comparison Survey

Directions: Please read each statement and indicate your response using the following numbers. 1= strongly agree about traditional class, 2 = agree about traditional class, 3 = somewhat agree about traditional class, 4 = somewhat agree about WEB, 5 = agree about WEB, 6 = strongly agree about WEB

1. Course material is covered more clearly in this format.

1	2	3	4	5	6
Strongly agree about traditional classes					Strongly agree about WEB based classes

2. I learn material better this way.

1	2	3	4	5	6
Strongly agree about traditional classes					Strongly agree about WEB based classes

3. The pace of the course is appropriate (neither too fast or too slow).

1	2	3	4	5	6
Strongly agree about traditional classes					Strongly agree about WEB based classes

4. This course format is convenient.

1	2	3	4	5	6
Strongly agree about traditional classes					Strongly agree about WEB based classes

5. I feel more involved with the material.

1	2	3	4	5	6
Strongly agree about traditional classes					Strongly agree about WEB based classes

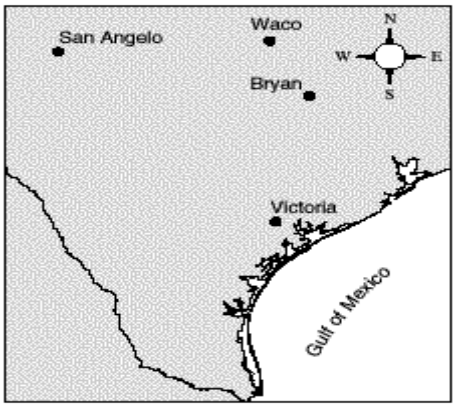
6. Overall, I would prefer courses to be taught this way.

1	2	3	4	5	6
Strongly agree about traditional classes					Strongly agree about WEB based classes

APPENDIX D

TAKS Science Section Test Example

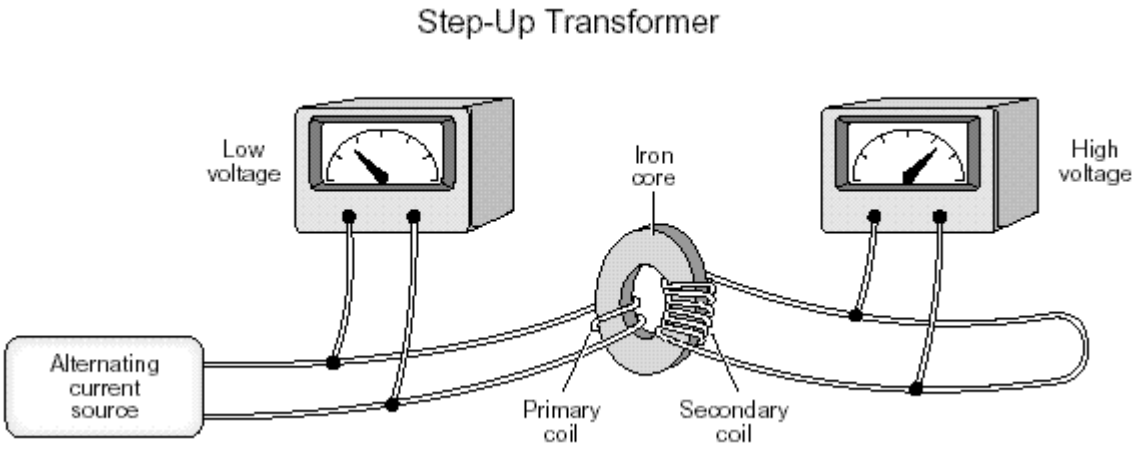
Question 1 (1 point)



What is the main reason San Angelo has the LEAST annual rainfall of all these cities?

1. It is the northernmost city
2. It is the farthest from the ocean
3. It is the closest to the Rocky Mountains
4. It is the only city to experience a west wind

Question 2 (1 point)



The picture shows a model of an electric transformer. According to this model, the secondary coil produces higher voltage because it -

1. has more wire coils
2. conducts alternating current
3. surrounds an iron core
4. connects to the larger voltmeter

Question 3 (1 point)
The hole in the ozone layer sometimes extends over the southern part of South America. This hole in the ozone layer could affect human health by --

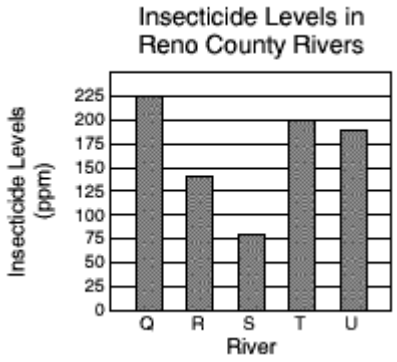
1. decreasing the level of blood sugar
2. decreasing the number of cases of frostbite
3. increasing the pH of stomach acid
4. increasing the number of cases of skin cancer

Question 4 (1 point)
Insecticide Levels in Reno County Rivers

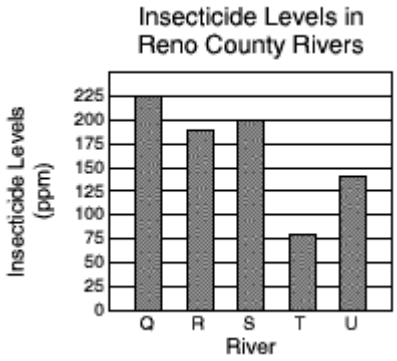
River	Insecticide Level (ppm)
Q	225
R	190
S	200
T	80
U	140

The chart shows the levels of an insecticide found in five rivers flowing through Reno County. Which of these graphs best represents these data?

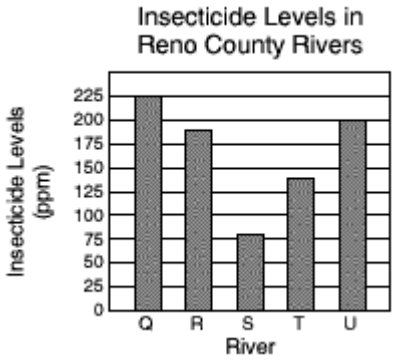
2.



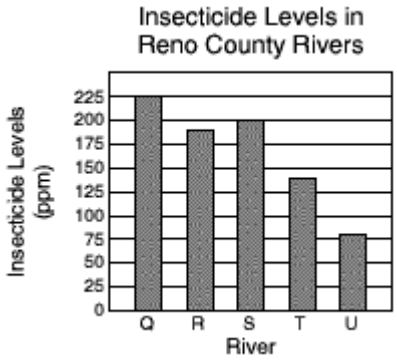
2.



3.



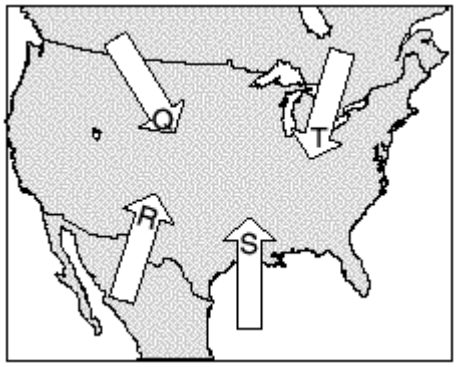
4.



Question 5 (1 point)
Adaptations are -

1. present in a species gene pool prior to environmental selection
2. the results of mutations occurring after the environment selects a particular trait
3. happy genetic accidents that occur after birth
4. displayed without environmental selection

Question 6 (1 point)



Which of these air masses would probably contain the most moisture?

1. Q
2. R
3. S
4. T

Question 7 (1 point)
Which of the following is not a drawback from using solar energy?

1. It needs to be concentrated to perform human work needs
2. It is available only intermittently
3. Using it is likely to upset the overall energy balance of the biosphere
4. Most of our present uses require energy in the form of a liquid

Question 8 (1 point)
The chemical characteristic of radioactive isotopes that indicates "containment time" is the:

1. mass number
2. number of electrons
3. half-life
4. number of fissionable products

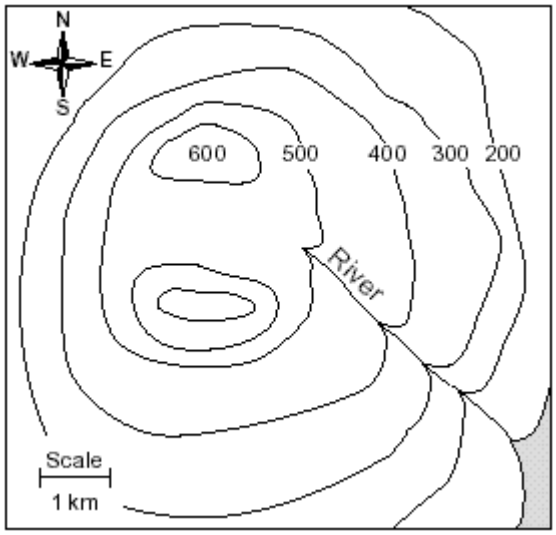
Question 9 (1 point)
The F-Scale for Tornadoes

F-Scale	Wind Speed (km/h)	Damage
0	<116	Light
1	116-180	Moderate
2	181-253	Considerable
3	254-332	Severe
4	333-419	Devastating
5	>419	Incredible

According to the F-scale, a tornado with 182-km/h winds will have a rating of --

1. 1
2. 2
3. 3
4. 4

Question 10 (1 point)



According to this topographic map, the length of the river is about -

1. 4 km
2. 6 km
3. 8 km
4. 10 km

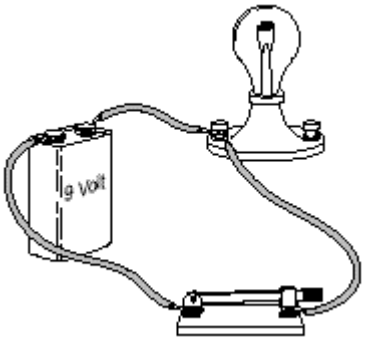
Question 11 (1 point)
Which of the following will enable humankind to increas food production in the next 40 years?

1. bringing additional land into cultivation
2. increasing use of fertilizer
3. increasing use of irrigation
4. none of the above

Question 12 (1 point)
Currently, unknown diseases are destroying coral reefs. The first step in protecting the coral reef is -

1. transplant and grow coral in cooler areas
2. collect samples and identify the causes of the diseases
3. remove fish that feed on the coral
4. identify the species of coral affected by the disease agents

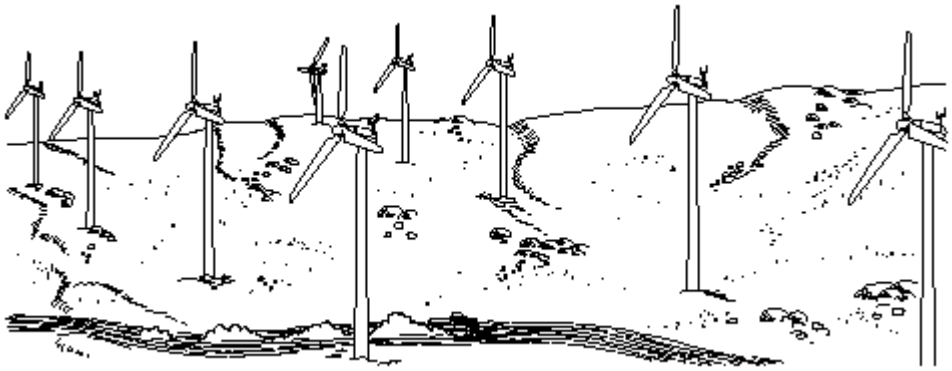
Question 13 (1 point)



The picture shows the design of an electric circuit that fails to produce light. This circuit could be made to work by -

1. using a bulb with higher wattage
2. moving the switch to the open position
3. connecting another 9-volt battery
4. attaching the wires to separate poles on the light

Question 14 (1 point)



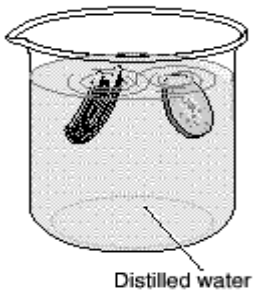
Using windmills is a possible way to generate electricity without burning fossil fuels. Although windmills may produce very low levels of pollution, they might be hazardous to -

1. animals that fly
2. animals that hibernate
3. plants that are pollinated by wind
4. fungi that produce airborne spores

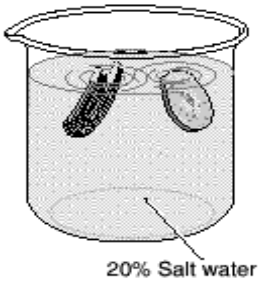
Question 15 (1 point)

This demonstration was designed to show how environmental factors can affect the movement of water across a plant cell's membrane. Water moving into the cell will increase the turgor pressure, while water moving out of the cell will decrease the turgor pressure. According to this information, which order of beakers will show the celery and potato slices from those with the MOST turgor pressure to those with the LEAST turgor pressure?

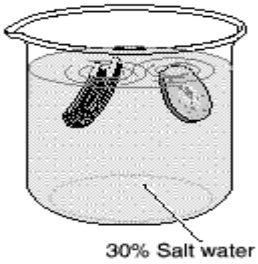
Q



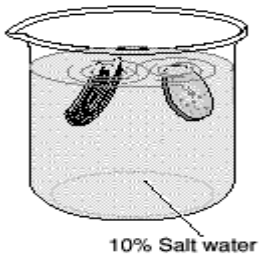
R



S



T



1. S, R, T, Q
2. R, T, Q, S
3. Q, T, R, S
4. S, R, T, Q

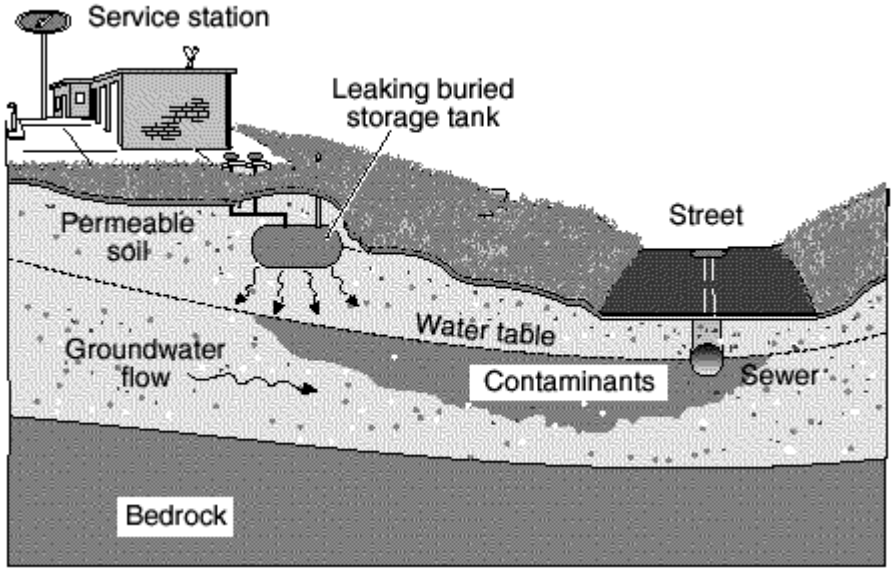
Question 16 (1 point)
Nutrients Found in Certain Foods

Food	Nutrient
Bread, pasta, rice	Carbohydrates
Nuts, butter, cooking oils	Fats
Fish, meat, beans	Proteins
Milk, leafy vegetables, liver	Minerals

According to the chart, spinach would be a good source of --

1. carbohydrates
2. fats
3. proteins
4. minerals

Question 17 (1 point)



The picture shows how a buried storage tank could leak gasoline into the environment. The most serious result of this accident is most likely the contamination of the –

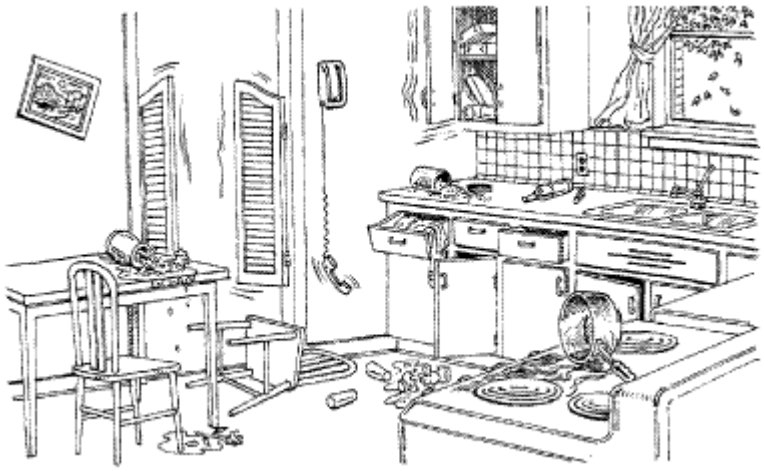
1. atmosphere
2. soil
3. groundwater
4. bedrock

Question 18 (1 point)

The MOST significant problem in feeding hungry people worldwide is that -

1. the world has insufficient agricultural capacity to produce food products
2. the hundry have insufficient purchasing power to buy food
3. poor people in developing countries do know how to farm
4. free food donations make farming non-profitable in developing countries

Question 19 (1 point)



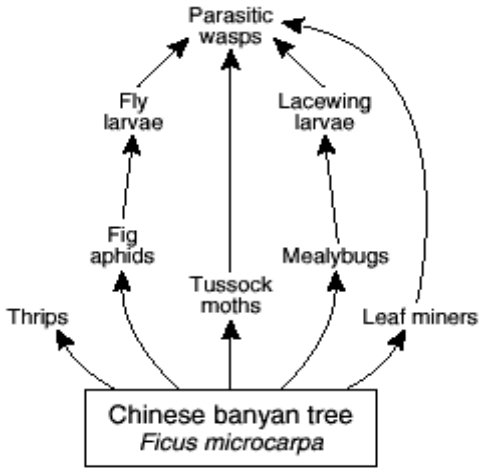
Earthquake Magnitudes

Richter Magnitude	Effects of Shocks and Populated Areas
< 3.4	Recorded only by seismographs
3.5 - 4.2	Felt by some people who are indoors
4.3 - 4.8	Felt by many people; windows rattle
4.9 - 5.4	Felt by everyone; dishes break, doors swing
5.5 - 6.1	Slight building damage; plaster cracks, bricks fall
6.2 - 6.9	Much building damage; chimneys fall houses move on foundations
7.0 - 7.3	Serious damage; bridges twisted, walls fractured; many masonry buildings collapse
7.4 - 7.9	Great damage; most buildings collapse
> 8.0	Total damage; waves seen on ground surface; objects thrown in air

According to this information, the earthquake that produced this damage had a magnitude of about -

1. 2.5
2. 3.0
3. 5.0
4. 6.5

Question 20 (1 point)



According to this food web, which insect group is most beneficial to the Chinese banyan tree?

1. Parasitic wasps
2. Mealybugs
3. Tussock moths
4. Leaf miners

Question 21 (4 points)

Suppose that a section of eastern deciduous forest was cleared for agriculture and later abandoned. In what order (first, second, third or fourth) would the following species reinvade the area.

Grasses →

pine trees →

deciduous trees →

Shrubs →

Question 22 (4 points)

Indicate whether the following human conditions or actions

a. increase or

b. decrease

the amount of municipal solid waste.

Affluence →

disposable diapers →

Recycling →

Goodwill industries →

Question 23 (4 points)
Match the U.S. energy sources of:
a. coal
b. oil
c. natural gas
d. nuclear power
e. water power
with their primary uses listed below.

1. production of electricity	a
2. transportation	d
3. industrial processes	e
4. space heating	b
	c

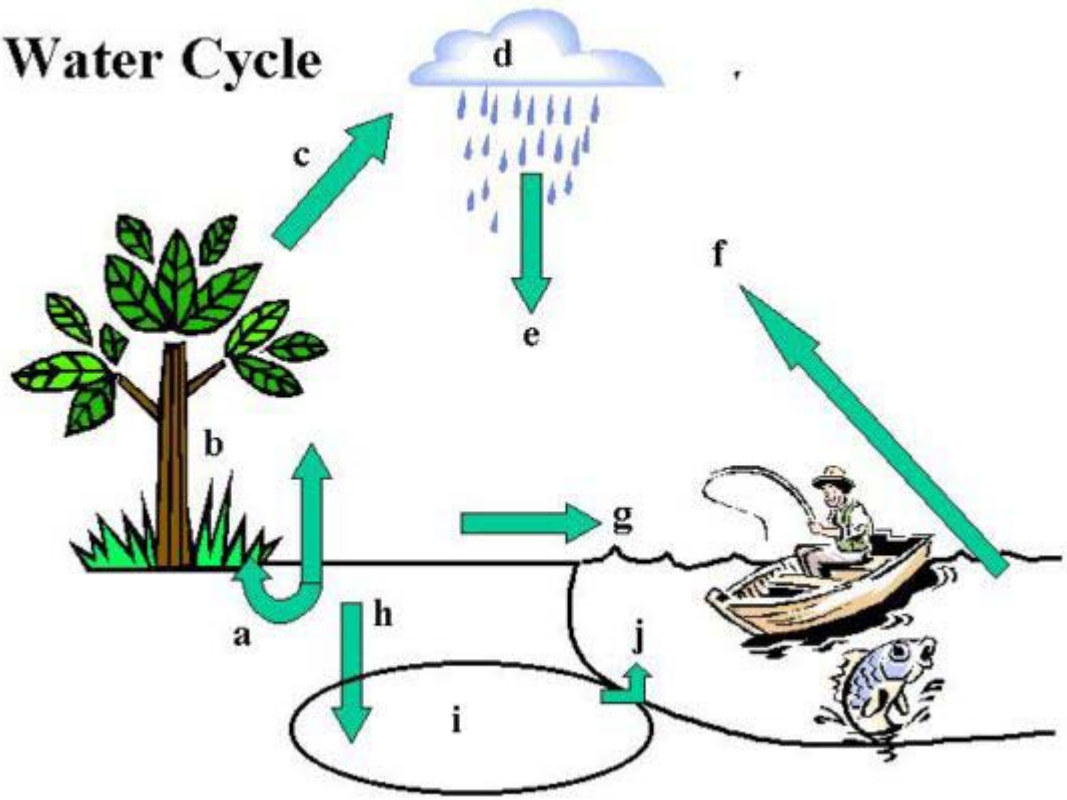
Question 24 (4 points)
The existing U.S. energy policy consists of:

1. mandates to increase fuel efficiency in cars
2. exploitation of public lands for fossil fuel reserves
3. subsidies of producers of solar energy technologies
4. advocacy of energy conservation

Question 25 (5 points)
Match the environmental problems listed below with the MOST probable cause including:
a. acid rain or
b. greenhouse effect or
c. ozone depletion

1. increased concentrations of UVB light hitting Earth's surface	c
2. melting of the polar ice caps	b
3. break -down and release of aluminum ions into soil ecosystems	a
4. high incidence of skin cancer in humnans	
5. flooding of coastal areas	

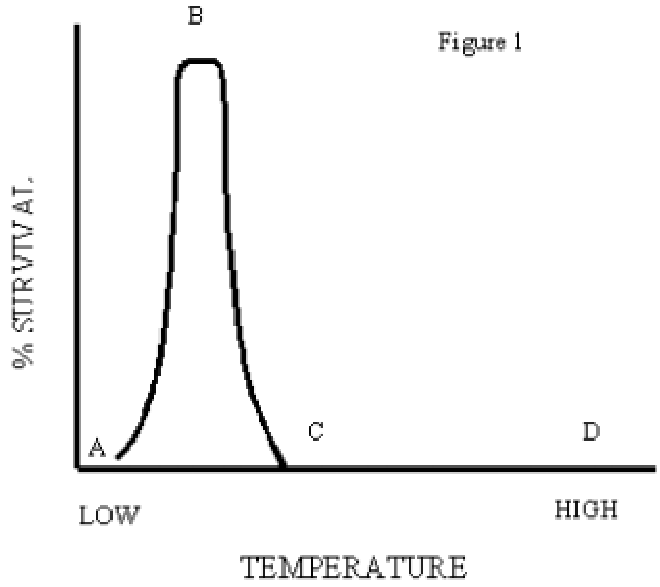
Question 26 (6 points)



Use the above figure of the water cycle and the arrows lettered (a - j) to answer the series of questions designed to test your understanding of the water cycle and the interrelationships between the water cycle and soil ecosystem's structure and function. Which lettered part of the figure demonstrates –

1. where the leaching of soil nutrients could occur?	i
2. surface runoff and possible erosion?	d
3. where water and nutrient-holding capacity are important?	g
4. evaporation?	e
5. transpiration?	h
6. condensation?	b
7. precipitation?	f
	c
	a
	j

Question 27 (3 points)



Interpret Figure 1 using point A, B, C, or D. Which point -

1. indicates the optimum temperature for survival?	c
2. is the limit of low temperature tolerance?	d
3. is the limit of high temperature tolerance?	a
	b

APPENDIX E

Science Teaching Efficacy Belief Instrument

(Please circle your response to the following statements)

1. When a student does better than usual in science, it is often because the teacher exerted a little extra effort.

Strongly disagree disagree barely disagree barely agree agree strongly agree

2. I am continually finding better ways to teach science.

Strongly disagree disagree barely disagree barely agree agree strongly agree

3. Even when I try very hard, I don't teach science as well as I do most subjects.

Strongly disagree disagree barely disagree barely agree agree strongly agree

4. When the science grades of students improve, it is most often due to their teacher having found a more effective teaching approach.

Strongly disagree disagree barely disagree barely agree agree strongly agree

.

5. I know the steps necessary to teach science concepts effectively.

Strongly disagree disagree barely disagree barely agree agree strongly agree

6. I am not very effective in monitoring science experiments.

Strongly disagree disagree barely disagree barely agree agree strongly agree

7. If students are underachieving in science, it is most likely due to ineffective science teaching.

Strongly disagree disagree barely disagree barely agree agree strongly agree

8. I generally teach science ineffectively.

Strongly disagree disagree barely disagree barely agree agree strongly agree

9. The inadequacy of a student's science background can be overcome by good teaching.

Strongly disagree disagree barely disagree barely agree agree strongly agree

10. The low science achievement of *some* students cannot generally be blamed on their teachers.

Strongly disagree disagree barely disagree barely agree agree strongly agree

11. When a low achieving child progresses in science, it is usually due to extra attention given by the teacher.

Strongly disagree disagree barely disagree barely agree agree strongly agree

12. I understand science concepts well enough to be effective in teaching elementary science.

Strongly disagree disagree barely disagree barely agree agree strongly agree

13. Increased effort in science teaching produces little change in *some* students' science achievement.

Strongly disagree disagree barely disagree barely agree agree strongly agree

14. The teacher is generally responsible for the achievement of students in science.

Strongly disagree disagree barely disagree barely agree agree strongly agree

15. Students' achievement in science is directly related to their teacher's effectiveness in science teaching.

Strongly disagree disagree barely disagree barely agree agree strongly agree

16. If parents comment that their child is showing more interest in science at school, it is probably due to the performance of the child's teacher.

Strongly disagree disagree barely disagree barely agree agree strongly agree

17. I find it difficult to explain to students why science experiments work.

Strongly disagree disagree barely disagree barely agree agree strongly agree

18. I am typically able to answer students' science questions.

Strongly disagree disagree barely disagree barely agree agree strongly agree

19. I wonder if I have the necessary skills to teach science.

Strongly disagree disagree barely disagree barely agree agree strongly agree

20. Effectiveness in science teaching has little influence on the achievement of students with low motivation.

Strongly disagree disagree barely disagree barely agree agree strongly agree

21. Given a choice, I would not invite the principal to evaluate my science teaching.

Strongly disagree disagree barely disagree barely agree agree strongly agree

22. When a student has difficulty understanding a science concept, I am usually at a loss as to how to help the student understand it better.

Strongly disagree disagree barely disagree barely agree agree strongly agree

23. When teaching science, I usually welcome student questions.

Strongly disagree disagree barely disagree barely agree agree strongly agree

24. I don't know what to do to turn students on to science.

Strongly disagree disagree barely disagree barely agree agree strongly agree

25. Even teachers with good science teaching abilities cannot help *some* kids learn science.

Strongly disagree disagree barely disagree barely agree agree strongly agree

APPENDIX F

Web Use Comments Fall 02

1	After the first few lessons, I felt that I knew the kind of expectations, so I didn't find the web-based materials necessary. If there was a particular concept that I needed help on, I would turn to the web-based materials.
2	People began to use the book more often.
3	People get busy and find ways around it.
4	No Response
5	Well, everyone just has to figure out their groove, once they establish a good and efficient study program with the least amount of work (we are in college) then we stick with it.
6	After the first few lectures, I determined that the web-based materials were not helping on the exams, so I discontinued my use of them.
7	Students became more confident with this type of course and felt like they didn't need as many sources of information. In all other classes most students only use the book and study guide to study and this was the same for the students taking this class. Students typically don't get as much from lectures or other resources in regular classes. Most knowledge in my case is gained through reading and practice tests.
8	Not sure. I felt like I gained enough info by just reading the book and doing the study guide.
9	I think that the lessons were not needed for the tests. Everything that was in the test was in the study guide or book.
10	I did not have a lot of time this semester and I found the book and study guide to be sufficient study materials.
11	Students realized they could get by without using these extra materials???
12	The lessons become self explanatory over time.
13	I did not have regular access to the internet.
14	There was just WAY too much work to have to watch the lecture and the power point presentation AND read the chapters and do the study guide. It just got to be where I think most people just read out of the book.
15	N/A
16	Everything you needed to know was in the book. I personally cannot watch a lesson on TV, there is a difference between watching a lesson and going to class. If everything was the same with the addition of a classroom lecture, even if it was not mandatory, I would have attended the lecture, over any of the other methods. There is an interaction that happens in the classroom that cannot be achieved anywhere else.
17	Wow! I just didn't feel like I needed to use it. Reading my textbook was sufficient for my testing purposes.
18	Maybe the students felt like they just had to read the book and do the study guide or maybe they didn't have enough time.
19	Getting towards the end of the year. People get lazy.

20	The textbook was more useful.
21	I'm not sure why it declined because I used the web material numerous times throughout the semester due to the fact that I really think it benefited me. I know some other students grades never got better so therefore, they decided not to even bother with this material.
22	I don't think that there was any motivation for me to learn. Since I didn't have to go to class, I didn't even think about the class until about a day or 2 before I had to take the exam. I think classroom lectures are much more interactive and give students a reason to pay attention. This class ended up being last on my priority list since it wasn't very easy for me to set up time other than when I signed up for class. I am a very busy person and when there is no reason for me to check out the stuff on the web, then why should I? I know that most students get busier throughout the semester and the same probably happens to them as well.
23	Maybe people just get exhausted by the end of the semester and run out of time to do these things.
24	I found that I could learn better by just using the book and the study guide.
25	Wow! I have no idea! I used it for every lesson. I know that sometimes you babbled quite a bit. And a lot of stuff you talked about would never even be on the test. It would be nice to get some helpful hints every once in a while.
26	I found that the textbook and study guide provided the most beneficial information for the tests. I was more able to understand the constant by reading the text and study guide. By using got many resources, I felt overwhelmed with the material, which tends to make me nervous when it comes to test taking.
27	The lessons were to time consuming and it seemed like using the resources on the web were pointless. They rarely worked and who would want to sit there in front of their computer for an hour listening to someone talk. It was very hard for me to even sit there in front of the TV watching the lessons for an hour. I personally would rather go to class and listen to someone talk than sit in front of the TV or computer and listen to someone talk.
28	I don't know…I liked the web-based materials.
29	Was bored with the class by the end of the semester and merely wanted to get finished, not motivated like the beginning of the semester.
30	The test was made to trick you and not to see if you could remember the material.
32	As it reaches the end of the semester, students don't feel the need to study as much due to laziness, and many have found ways to get test answers from other students.
33	Much of the material on the test came straight from the book, not making it worth the effort to use the web based material.
34	After the initial fears of the first exam were overcome and students understood how to study and what kinds of information was needed they accommodated their studies by just studying what they felt was necessary and many people studied in groups to better understand the important information.
35	I just was able to get the information from the textbook more easily.
36	Yes.
37	I felt that using the book and study guide was sufficient enough to do well in this course.
38	When I studied for each of the exams, I used the adobe acrobat notes. I rarely

	used the extra websites for exploration – there is just not enough time to look at everything and study the material for the exam.
39	I read more out of the book and used the study guide.
40	The web based material proved to be less and less helpful.
41	As a web based course, the student was able to figure out which way worked best for them to prepare for the exam. Obviously, in most cases the traditional way of using the textbook and study guide as means of gathering knowledge was the best way, in the student's opinion, to study for the exams.
42	Students may have become more comfortable with the information from the texts and study guides to prepare sufficiently for the tests.
43	I don't know.
44	After the first test you know what things are the best to study for the test.
45	I don't know what you mean by web based material. If you mean websites to look at, I just didn't feel like I had time to view them. Yet, I bet they were helpful for teaching examples.
46	The book and study guide were sufficient enough materials to prepare for the exam. I found that I did just as well reading the text and doing the study guide than I did accessing gall the other materials.
47	The only think I suggest is making all of the tests available right away.
48	I think we did not really know what to expect of the class at the beginning of the semester, so we wanted to do as much as possible to be prepared. Near the end of the semester we were better prepared of what to expect for each test.
49	I'm not sure, I used the web site the same throughout the course.
50	I used them about the same all throughout the semester.
51	I was able to use only text and study guide and make acceptable grades.
52	I was able to understand material by reading and applying it myself.
53	The book material and study guide were sufficient enough.
54	People realize that the book and study guide are helpful enough.
55	I started off trying to use the material. I feel that I declined in the amount of material that I used because it didn't help me very much in preparing for the exam. For me, the web-based class was harder than a traditional because there is more discussion and input from other students and you can have the discussion during the lecture time and not a day(s) after.
56	My thought is that as the semester goes on people study less and this includes the use of internet resources.
57	More people could have relied on the book and/or study guide.
58	This graph does not at all reflect how I used the course materials. My goal was to succeed in this class and not much changed during the course of the semester to not make me look up and listen to the lessons. I would guess that people got busy and decided to just read the chapters in the book instead of read the lessons because his lessons did follow the book exactly.
59	As the semester gets going more and more work is given so less and less time is available.
60	I don't think the class felt it was worth their time to sit and watch a lecture or use the streaming video, and power point. We were able to get a decent grade using the book and stud guide. If these resources had been shorter or of better access and quality I would have used them and probably received a better grade.

61	I found that the text book and study guide helped me prepare the most. When I prepared using the website, I felt like I had much more information than I needed to study well for the test. I would have too much to study and then I would not efficiently cover the type of information you wanted us to know. After taking your test, I realized that you cover much of what is in the text chapters.
62	I didn't look at any material except my book all semester so I don't know.
63	All of the information we are tested on in the book. If I study the book alone I will do well. If I choose not to study the book I can use the other resources but I will still miss a number of questions. Suggestion, if you want students to use more than the book, test over more than the book.
64	I found the book to be sufficient and my computer is slow and frustrating.
65	People got lazy towards the end of the year.
66	People found a better way to study.
67	I felt prepared enough and thought I would do good on the exams with only using the text book, study guide, and TV lectures.
68	It was very hard keeping up with this class since we did not have to go to class I just forgot about it. When it was time to take the test I was never ready for it. The videos were really hard to watch because my roommate hated to listen to them and on the computer watching the videos I would get distracted by my surroundings.
69	I found that almost all of the material needed for each test was in the text, therefore I read the text and did the study guide each time.
70	It just seems like you can get all the information that you need by using the book and study guide and you don't have to worry about the other things.
71	To be honest, it was boring to sit there and look at the power point lessons. The book and study guide were sufficient enough to make a good grade on the test.
72	I only used the web-based materials for some of the first few lessons. After doing reasonable well on the first test, I found that I could still do well without spending the extra time with the web-based materials. However, it was nice to know that the extra practice was available on the web, if needed.
73	The decline most likely had to do with time restraints and the knowledge that the extra material would not be "on the test". Students know they can find this information on the web later if they have interest.
74	I did not use any of the resources except the study guide and text book. My home computer used the dial up modem and was not fast enough for anything else.
75	The power point presentations in conjunction with the text were the two most effective teaching materials in the class.
76	There are no classes no processor basically. Nothing is keeping you accountable. Nobody actually watches the lesson they just read the book and half the information asked on the tests are actually from other chapters not on the test. This was the worst class experience ever. I didn't sign up for this, nor did I want a web based course. I signed up for a class and then was told first day of class it would be web based. I was your test dummy and now GPR is lower because of it.
77	I didn't feel that I got much from these. I felt I could do well with the lectures, notes, and text book.
78	I could answer the tests with just the book and study guide. When I tried to get power point lectures off the web later, I could never get them to come up.
79	Because most people probably found that they could do alright with just filling out

	and studying the study guide.
80	I personally felt that the computer lessons were the most helpful. However, I studied for the first few exams and then declined and did about the same on the exams.
81	The textbook and the study guide provided ample information for the exams.
82	Because it seemed to get easier towards the end, or more interesting so it was easier.
83	I think it is because people start learning on their own because of time. But it would be very beneficial to use what you provide. If I would have I think I could have made an A.
85	The web-based materials in my opinion were not directly linked to the questions on the tests. You could perform the same without using them.
86	The more people took the tests the more they saw that the questions were related to the book and study guide.
87	After the first few tests it can be found that the textbook and the video was sufficient to learn the material.
88	Mainly just due to decrease in time available to utilize the sources. I tended to use my book more as the semester went on. However the times I did use the online sources, I usually used them for long periods of time.
89	We (I) found that everything we needed was in the book and in the study guide to pass the exams.
90	I began using the web-based material but unfortunately I was juggling school and work so I slacked off on the use and really hit the book and study guide hard toward the end. The tests came so often that I just chose other ways to study that worked best for me in the time I had available.
91	The lessons were boring and the information on the tests seems to be different so there is no need to see to use the web since the information is in the book and study guide.
92	It seemed the tests were directly from the book and the reading, so I didn't need to watch the videos.
93	In the beginning of the class, I used the web-based material to enhance my understanding of the content. As I took the exams, I realized that the level of preparation was not as necessary to utilize the web-based material as much as the text book and the study guide.
94	I used the text and the study guide, as well as the TV productions. I have no explanation for the decline, as I stuck to the same technique all semester.
95	At first I thought the web would help with the lessons, however I then discovered that I could learn most of the information on my own through the book and study guide because I am a more independent learner and I am incredibly busy with all activities. Therefore, I only used the web a couple of times.

APPENDIX G

Web Use Comments Spring 03

1	I guess students are excited about the new year at the beginning…and then towards the end slack and give up on trying and just look at their textbooks…personally, I found the tests MUCH easier when I had read, done the study guide, and watched the lectures. To me, I paid for this class and 1 day plan on teaching the things I am learning, so why not use it to its full potential?!
2	I believe that at the beginning of the course students don't know exactly what to expect so they are more likely to spend more time and use more resources in studying and preparing for the exams and they become familiar with the format and such, they do just want is needed to get the grade.
3	Less time…work and other classes. I just got so caught up with other classes and work that I slacked off as the semester went on.
4	Increased reliance on the textbook and study guide.
5	I really liked all of the resources available to help me prepare for the test. They helped a lot. I'm not sure why there is a decline.
6	See answer to 22.
7	As the semester goes on and other classes and activities eat up student's time, it is nearly impossible to have the self discipline to sit down and watch a lecture and that is why there is such a downward fall.
8	As the semester goes on the students figure out how to get the information they need to do the work necessary for class and therefore hits decrease.
9	At the beginning of the year students use all the online lectures and notes a lot, and then they begin to find the way that helps them learn the information in a quicker, easier way. I used the power point slides a lot for the first test, but as I kept having to watch them over and over, I got sick of staring at my computer screen and would just flip through all the slides really quick. I'm sure some students learn better just reading the book, and some slack off and just don't use the online resources at all.
10	I felt like if I studied and read the book and the study notes, that I should do fairly well on the exam but the questions on the exam were worded or it wt was just different studying the study guide and 30 minutes didn't seem like enough time to take the exam (especially when your computer is slow). Another 30 minutes would seem appropriate. I read and comprehend at a slower pace and I felt pressured to answer the questions on the exam.
11	By the end of the semester people get so busy that all they have time to do is the book and study. For the most part the test comes from the book and study guide questions and the web is not utilized.
12	For me it was more a factor of convenience. I do not have internet access at my house, so using the website involves a trip up to campus. I used the website to clarify subjects that I did not comprehend totally.
13	Students did well on the first test and decided that they would do as little as possible in order to keep on making a good grade in the class.

14	I found that I was extremely worried about the exams at the beginning of class because I had never taken an online course before, so I utilized more material for the first several chapters. However, without any accountability due to the lack of actual class meetings, the motivation to do well and utilize all the materials decreased as the semester went on.
15	I don't know, I used all the materials for every chapter!
16	General student lack of effort and hard work.
17	I think it declines because things start to get busy with other classes and it is easy to put this one last. It is also easy to forget about tests dates and keeping up with lectures when you don't have to go to class.
18	I think students realized that if they read the book and did the study guide then hey really didn't need to watch the lectures because there are just a few lecture questions on the test. Also, near the end of the semester everyone starts to get burnt out and you don't do as much as you did in the beginning of the semester. Also, I think people get the hang of using the web materials and get what they need the first time they look whereas in the beginning it is new so I looked at the materials a lot more often.
19	The semester just got busier and people found they could "get by" without using it even if they didn't do quite as well as they could have.
20	I discovered quickly that the presentations pretty much covered the book. I continued to use the web however for reinforcement of the material. I also discovered early on that the video and the power point presentations were very similar. I chose just to use the power point.
21	I used the web more than anything.
22	The only things I really used for every test was the textbook, power point notes, sometimes the lecture/ power point, and the study guide.
23	I found that the book and the study guide worked as well as the video lectures. I would read the chapters and complete the study guide activities because I can read at my own pace and skim the boring material.
24	Mainly the book and study guide were the most useful to help prepare for test.
25	The tests aren't that hard so I think as people do well in the beginning, they think they need to put less and less effort into the class and it bites them in the butt.
26	Even when I did read the chapters, watch the videos, and do the study guide, I did not do that well on the tests. So why keep using my time to do those things when I got about the same grades anyway.
27	The web based material just was not as beneficial as the text book was. It took too much time to read the text book and then listen to the video or power point presentation. In order to best use my time, I would not use the web material except for printing out the power point slides, but even then, I only printed out the slides and did not listen to the voice-over that went along with them. To tell you the truth, it was a bit boring and monotonous and did not add that much to the text.
28	College students are LAZY!! Perhaps people thought the course was really easy…I didn't think so though!
29	I found that I often ran out of time. I wouldn't keep up watching the videos and then when it came time for the test, it was easier to just read and do the work book.

30	Actually, at the beginning of the semester I did not listen to the lectures as much. I increased my knowledge on web ct towards the end of the semester and listened to the lectures online.
31	It was difficult to view the streaming videos and other web based material with my dial-up connection…unfortunately, living in the middle of a pasture has some draw backs, along with its lures.
32	Well, as the end of the semester approaches other classes start to pile up the work and so students don't have as much time to get on the computer.
33	For one thing, students get busier and busier as school progresses, which allows less and less time to utilize the study resources.
34	I think people just end up using the text and study guide for preparation.
35	Towards the end of the semester, it becomes much easier to skip the videos and just read the text books and do the review.
36	People begin to forget and put off learning the material. They think the tests are easy so they don't study as much. I heard someone saying they take their tests in groups so perhaps they don't study as much.
37	I believe that students became lazy. This is not difficult material, much is common sense so they do not deem it as an efficient use of time. I, however, do not agree and by the time I take exam 6 will have watched all but the first 4.
38	It was really difficult to sit and watch the streaming video because there was no interaction available.
39	Basically, I jut think everyone gets tired and worn down. No one is in the mode to study in the later parts of the year.
40	As the semester goes on and students have more to do it is harder to make time for viewing online coursework. Since this class is sort of work at your own pace, it is easy to push it to the side and work on other classes.
41	Over a period of time students do not feel that they need to rely on the web based materials because they are aware of the format of the test.
42	The decrease is from reading and doing the study guide on your own instead of having to listen to some of the lectures.
43	Time.
44	The study guide and book taught enough information for the tests and was presented in a clear fashion for learning.
45	For the first test I used all the resources at my disposal but then I realized that most of what I needed came from the text and the study guide. I didn't rely as much anymore on the lectures.
46	I looked at the website almost every single day, including weekends, because I thought it was a wonderful resource. I was home-schooled for part of my education and therefore I am very familiar with web based resources and web based course material. I know that I ran out of time once or twice and took the exams without watching the videos. I learn best from printed materials, I am not an auditory learner, therefore the text book and study guide were what I mostly needed to master the course content. I used the videos to supplement a few lessons that were more difficult for me. The lessons included the Atmosphere and Air Pollution chapters.
47	At the beginning of the semester I wanted to get familiar with the web ct. Becoming familiarized at the beginning I would have more hits. As I became

	more familiarized I knew where I needed to go while connected to web ct.
48	People at first did not know what to expect when taking your test and by the end they had a set way they studied and sometimes that does not included the web site.
49	The text book is very useful, and it is easier to study from.
50	I pretty much used the same resources each exam but others who used a lot of stuff for the first may have realized that they didn't need to do so much work for the test and cut back.
51	I assume that many students get more confident with their knowledge as classes go on, or they find other means to get the information. This would conclude a decline in the hits per lesson.
52	Because you can read the book and do the work book and get the information you need to learn.
53	As I had some difficulty accessing the power point notes and links, I usually just jotted down the websites mentioned and searched for them on my own later. Perhaps other students used the resources in ways that were not detectable as well.
54	It's hard to stay caught up. You start to put off tests until the last minute.
55	Probably because people just got lazy!
56	I guess students get bored reading the material, procrastinate, and then try to take their test with in-hand. Six tests is a lot to study for in a semester and I felt a bit overwhelmed. Always seemed like I would finish studying for one test, take the test and then I had another one the next week.
57	I found out I could do well on the test by just using the text book and study guide.
58	Tests at end worth less points.
59	I couldn't get the streaming video to work, and the voice-over power point lectures were very slow to load. This made watching them and paying attention very difficult. I became very distracted with waiting for them to load, and when the sound would break up.
60	As the semester went on, students probably just picked one way to study instead of many. Instead of using the website, study guide and book, most students probably just turned to one method of studying. I believe the method most chose was the book and/or study guide.
61	I would say the reason this occurs is because at the beginning nobody knows what to expect and how to do everything. Once they know more or less what tests will be like, they adjust accordingly to what they need to study and how. Also, students are more structured at the beginning of each semester and towards the end they are usually just trying to get the semester over with. I was using the internet regularly and before each test until the last 2 exams and this is because I ran out of time and I didn't structure my time accordingly very well.
62	I believe the students realize that they can do fine on the exams without the extra research.
63	Easier just to read the text book.
64	I think people begin to look at it less as you get to the end of the class. Ready for a break.
65	The book is efficient study material for the tests without the additional depth of using the web based materials.

66	It takes entirely too long.
67	The web based materials were very overwhelming. After taking the first test, I felt that I was lost in the information. I didn't have enough time to take the tests so I felt really rushed, like a lot of information in my head would confuse me. I pretty much stuck to the text and study guide for the entirety of the semester. I would have received an A in the course had the information on the web been less in quantity…even though the quality is very nice and the web based classroom was very convenient. I was simply overloaded.
68	Book is more helpful for exams.
70	Maybe because they use the book and study guides more than the web materials.
71	Due to not actually having a class people forget to do the online work necessary. Some, not me, feel more confident that they know the material enough not to use the web-based material. A study guide is extremely necessary, to bad they were sold out EVERY time I tried retrieving one.
72	Personally, I discovered the knowledge I was able to get from the text. As the semester went on, the reading got more enjoyable. Although I tried to watch as many of the videos as time would allow, the text just really helped me learn.
73	I think that since the tests are every other week and there are so many, it is hard to keep up with viewing the website often and studying as much as one could for the first test. There's maybe more a lack of motivation due to the number of tests being so stressful that they are so close together.
74	I think the materials that we were provided with didn't help us on the tests. The tests were incredibly difficult, and impossible to study for.
75	Students are exploring the different learning materials early, but then realize where they need to get the information they are looking for. By the end of the class, students just lose their motivation.
76	When students become familiar with a test format they start studying just the basics and what they need to know. You can make pretty good grades on the test by just using the study guide.
77	I believe the web based sources helped a lot… but I did not have access to a computer that often. When I came to use the computer it was usually just to take the test.
78	I do not know why it declined – I used it every test because that was the easiest way to learn the material because Dr. Adams summarizes the whole chapter for us!
79	Students probably didn't have the computer available to use for web purposes.
80	They knew they did not need it.
81	I don't know I never used them except for the first test. But, it was faster to read the book and answer.
82	I think as we progressed in the course, we understood what we would be asked for so we didn't use the website as much.
83	Most of the time you could do find on the test with just using the book and the study guide to study for the test.
84	Students are lazy.
85	Tests could be taken from filling out the study guide alone, and the ease of watching the videos.
86	The book teaches the basics you need to learn. I like taking my books and study

	guide with me to study outside – can't do that with a computer. Also, it takes more time to view all the videos and notes.
87	I think it is just because the "internet class" is a new idea, at first people are really fired up and want to try it out. But then they go back to their old ways of just using the book.
88	People found out what worked for them and stuck with the best method.
89	I was having family problems and was unable to sue the web as much as I wanted to.
90	I feel that at the beginning of the semester you always try to use every tool available, but as the semester progresses and things become more hectic, you do what you have to in order to get by.
91	I thought the information was useful in preparing gfor the tests, so I used it. I guess people just got or felt that the book was enough to prepare them for the tests.
92	Not sure why…my use has increased.
93	They just found other ways to make the grade.
94	The book is more than sufficient in conveying the materials and is probably the most significant in determining factor of success in testing. If there is a decision between the book and the web materials, the book is more comprehensive and winse out over the auxiliary web materials.
95	People get tired as the semester goes on. Or maybe they found a more effective way to study for class.
96	I think that in the beginning people want to try to keep up with the course material, but as the semester goes on, the work in other classes adds up, and its easy to put this class to the side, since its web based.
97	I got the most out of the book and study guides. It seemed like the exams I studied for the most, using the web stuff I did poorer on the exams. I don't know if that is just me but that's how it happened.
98	I believe that students felt they did not need to watch the lectures to make a good grade. All they needed to do was read the book, look at the lecture notes, and use the study guide.
99	Laziness.
100	I believe, in all honesty, that students find a way to take a "short-cut" when they study, and I found that if I just used the study guide and the text as supplemental, that I didn't need to watch the lessons.
101	Book was more helpful.
102	I think the main reason there is a major decrease is because we are not forced to actually to those things on the web. At first it is really great, but as the semester goes on, we forget and get involved in other things and then just use the book and study guide to catch u p or what not. I found that if I watch a lecture on TV then I would look over the power point and catch up or read my book with Professor Adams and follow along with him. I know my grades don't really reflect that I did all of this because sometimes my brain freezes, but I think I really learned a lot in this class and I really enjoyed it.
103	I got frustrated and gave up using the web tools because no matter how much I used them, it always seemed like I never got the grade that I wanted on the tests.
104	Students become lazy and realize that they can get by without watching the

	power point presentations or using other web based materials.
105	I didn't feel they were necessary to complete the exams and found little extra time to look at the stuff.
106	After the first exam, I realized that I was performing well by reading the chapters and power point notes and completing the study guide. Since I did well, I did not feel the need to use all the web based materials. I was not very comfortable using them in the first place because I am not very familiar with that type of instruction. Perhaps other people feel the same way, which could be a possible explanation for such a decline in the number of hits per lesson.
107	That's a tough one. I'd say perhaps make a more interactive study guide for the tests where you quizzed over the optic given in lecture. Questions that are more closely related to what might be on the test.
108	I used more of the course content materials that were on the web ct than anything else.
109	After the first test, students have less time to study with other things going on.
110	Typical end of semester burn out.
111	Students figure out the minimum amount of work they need to do in order to get the score they want.
112	It seems like the students stopped relying on the web materials, like the videos and power points focused mainly on using their study guides and books. I however feel I learn better when I can at least see the professor and interact with him with the notes.
113	Probably because you can just read and review the study guide and do fine in the class without all that extra.
114	…

APPENDIX H

End of year comments Fall 02

1	I really recommend the web-based class, it allowed me to go at my own pace, and I really feel like I learned a lot from this class. I am much more environmentally aware than before.
2	I believe I have a greater understanding of ecology after having taken this course.
3	I love that this class takes into consideration that we do have lives beyond school.
4	My opinions may be skewed because I prefer classroom education far more than web based courses.
5	This is my first online class and I really enjoyed it…it kind of spoiled me because I was able to do it on my time and at my own pace…I'm pretty busy all the time…I'm a full time student with 2 (working on 3) jobs just to pay bills and being able to do this out of the comfort of my own home and not having to worry about making it to class "on time" really helped out…I hope I can do this for more of my classes in the future!
6	I disliked the disconnected atmosphere. I didn't feel as though I had direct access to the professor.
7	No
8	No
9	I really think that this class should not be taught online.
10	The course was very beneficial to me. I did not feel in any way that I was being limited by taking this course in this manner.
11	I thought it worked well for me not to having to attend class at a certain time, and being able to go at my own pace.
12	It was an interesting way of learning material.
13	No
14	I am personally a fan of being IN a classroom no matter how boring and hearing the info in person, not on my own. I wish this class could have been offered in a classroom like setting also.
15	N/A
16	I did not learn very much. I am not going to be a science teacher. I would have much rather taken an astronomy class.
17	No
18	Dr. Adams was a good teacher.
19	No
20	No
21	I really liked taking this class this way because it was so convenient but I didn't do as well as I thought I would.
22	I think that the best teachers are the ones that can get the class involved. I did not feel like I learned the maximum amount of information in this class that I could have because I had no motivation to learn. I did not enjoy at all sitting in front of the computer and TV to listen to lectures. My life is not made up of lounging on the couch or in front of my computer. And when I do lounge on the couch to watch the

	TV, I am not usually in the best situation to learn. I had roommates home cooking dinner, wanting to watch something else, friends calling on the phone, etc. I signed up for the class listed in the course book that DIDN'T say web-based for the specific reason that I have other things to do and I don't have time to find random times to be on the computer. Dr. Adams, I think that you are a great teacher with an amazing amount of passion for what you teach, but I think you would get students a lot more involved if you used different teaching strategies in your classroom instead of on the web/tv. Take students on field trips, get them involved in the information learning, doesn't mean we learn any better than the kids that I'm learning to teach. So often the teachers that are "teaching" me to teach don't even know how to teach themselves. You have a great idea about using the web to enhance students' learning, but I think the best way to do this would be to teach in the classroom and then maybe have outside research on the web to continue the learning. Students could read/print out the info. And then bring in the info to discuss in class. You're right, if you sit there and lecture for an hour, not everyone will be paying attention, but if you expect students to participate and require them to be prepared and called on in class, students will be much more responsive. Thank you Dr. Adams for working so hard on this web-based learning. I know you only want the best for us, so hopefully you will take my comments/suggestions into account. Have a wonderful and blessed summer!
23	I found it very interesting!
24	I felt like I was just having to cram material into my brain just to take tests, and do not feel like I really learned as much as I would have if there were a lecture.
25	I thought some of the questions were ridiculously hard. And if I didn't have a book in front of me I would have failed every test. Some of the questions were worded poorly and I just thought that some of them were completely pointless.
26	Nope
27	I will never take a web based course again. I feel that I would have made a much better grade in the class if I was able to go to class and be able to see the teacher and talk to him. I also did not like the way Dr. Adams approached things. I asked him a couple of questions and he responded to them as if I were stupid. They were good questions that many wondered about and all he did was make me feel stupid. He was not of great help even when you posted tings on the discussion board. And he was not quick to respond to your emails.
28	Interesting material.
29	Do not see the relevance of the class. I am not nor do I plan to ever teach science to fifth graders. This class was merely a credit and the mere idea that the professor announced the first day of class that his goal is to be able to teach out of his home says more to me than anything else about his professionalism and desire to teach. Furthermore, I think it says quite a bit with regards to the impact of technology on our society. It is a wonder that people don't communicate anymore and that risk factors for health problems are on the raise, everyone is inside hiding behind machines not interacting, and kids are hiding behind video games, not outside experiencing what they are being taught.
30	The class was alright.
32	No
33	The only difficulty I had was with the clarity of some of the questions. A number of

	the answers were arguable, but being multiple choice, I was forced to pick the one I thought the professor would want.
34	I liked the TV lectures because I cold be in bed and takes notes. I could record the lectures and fit them into my schedule and review them at anytime for clarification on various topics. I seem to recall more information through the lecture broadcast.
35	It was an interesting class.
36	Maybe
37	No
38	I liked the fact that in this web based class we could take the exams at our own pace (with limitations of the due dates). This would not ever be considered in a traditional classroom. But although I enjoy being able to take the exams when it is most convenient, I do think that I personally learn more from seeing and hearing in a traditional lecture based class. I noticed that throughout the beginning of the semester, I was better about keeping up with the readings and the study guide before each exam. However, towards the middle of the semester I became lack in my readings and would only read a day or two before the exams. I think that this class has a good deal of information that will be useful for future teachers to know. But I am not sure how much material I will remember once the class is over and I am teaching.
39	I really enjoyed the class!! Dr. Adams really did a good job!
40	I feel that web based classes don't punch me to do my best work.
41	I wish that prior to registering for this class I would have been made aware that this would be an on-line class. There were no means of communicating that information to us as student's until the first day of lecture.
42	Having the tests available for the entire semester but still with due dates so the students can pace themselves but may also take them when it is most convenient.
43	No
44	No
45	I listened to all the lectures, and took great notes. But I'm making a B and I feel as if I earned and A. I wonder if the web based teaching has lead to a decline in overall GPR for the class.
46	I could never get the streaming video or the voice over power points to work. I watched the lecture on TAMU for the first couple of lessons, but it was too late to be able to sit on my comfortable couch and not fall asleep.
47	I felt that Dr. Adams put a lot of work into this class and I truly felt I learned a lot. It felt more voluntary instead of something that I had to do. I learned a lot in this class.
48	I think that the students should be aware that they are in a web-based class before going to class on the first day. I know for me and some others as well, we were not aware that this class was going to be over the internet.
49	No, it's been a great class and I have enjoyed it greatly.
50	No, but I wish there were some type of lectures besides the ones on TV.
51	No
52	No
53	My roommates came in and bothered me during class time on TV and that became frustrating…but I still made it though.
54	No.

55	The class was okay. It is flexible but I feel that was not good for me because I enjoy listening to the lectures in person and be able to have class discussions.
56	I would like to say that there are advantages and disadvantages to taking an online course. I feel that this class made it easy to find time to take the tests and that Dr. Adams was willing to help us anyway he could. The different types of teaching tools made it easy of anyone to learn.
57	Overall, I enjoy web based classes because it gives me the freedom, to a certain degree to choose when I want to take the tests.
58	No
59	No
60	I didn't feel that when I asked Dr. Adams a question over email, that he answered it well. Often his answers were "please come by my office" etc. In my opinion, if this class is to be truly web based, the questions should have been answered in a timely fashion over email. Also I disagree with the Pre/Post Survey being graded. We were not aware we would have to take such a survey and especially not aware it would be taken for a grade. Our grade was supposed to consist of 6 exams. This was not given to us in the syllabus etc and should not have been sprung on us at the last minute!!! This is unfair and against university policy to add a grade to the class rubric after is has been set without consent from the class.
61	Thanks for your help and taking the time to make this class useful.
62	Might have an optional final for people can test out if they want to.
63	No
64	I thought the web based class was very convenient and that's what I liked about it but I felt that I could have had more interaction and learned the material better had I been in the classroom having classroom discussions with the prof. and other students.
65	Considering it was an online course, Dr. Adams did a wonderful job at keeping us up to date and giving us plenty of information!
66	No
67	I would take other classes that were web based. It is nice to be able to complete things on your own schedule.
68	Not really.
69	I really enjoyed having the opportunity to work on this course with my own pace. I also enjoyed the freedom of not having to attend class each week. It was very nice to be able to see the lectures on television or online.
70	I am just upset that the fact that I did all my own work on each test and will probably receive a B when I know for a fact that there were groups that cheated and will probably receive an A by taking the easy way out. It was a good class and I know that the teacher has no way of controlling this, I just wish people would abide by the Aggie Code of Honor more.
71	No
72	Good course.
73	Dr. A. I really loved this class but I do have only one complaint – some of the questions on the exams either contradict themselves or the course materials, don't pertain to the sections that are listed, or are fairly vague. It seems, occasionally, that you updated or changed some aspects of a section but didn't go through and double-check all the materials. I understand that there are a LOT of materials to

	go through, but I want the students of this class to clearly and fully understand this material as much as you do and I feel these discrepancies draw away from that goal. As well as causing disrest amount the troops I'm sure. Thanks though.
74	I do not like web based classes. I did not have cable and therefore saw no lectures. If I wanted to see any of the power point notes then I had to find time to go to the SCC at school to view them. And I was not able to print them because I would have paid for it beyond 150 pages. When I signed up for the class, I did not know it was a web based course or I wouldn't have signed up for it. I will say that the course expectations were reasonable, and it was still a good course overall.
75	When I registered for this class there was no indicator that it would be a web based course. When I found out that I would not be in a classroom for the semester I was very disappointed. I do not enjoy taking classes online because I prefer to interact directly with a professor in a classroom setting. It was said that the reason for teaching this class online was for convenience and to help students work around their busy schedules. However, many of us pre-registered for this class having allotted time for it. I am sure that Dr. Adams is a very interesting processor and I would have liked to be able to interact with him in a classroom setting. I know that I would have learned more this way. Although the majority of this response has been negative there are a few things that are beneficial in taking a web based course. It requires dedication and motivation to do well in these types of classes. There is also a level of responsibility that must be met. As far as a way to build character, web based learning is pretty good because one is required to take initiative in learning the material. Thanks for taking the time to read my input and I wish you luck in the future.
76	I hated this class because it was web based. I will probably fail because I do not have the study habits for a web based class. You should have told people that they were signing up for a web class. Then I thought I would try it and it ended up being horrible! Dr. Adams was nice and helpful as possible, but a professor can only do so much when he doesn't have regular class.
77	It was fun and interesting.
78	No.
79	Nope.
80	This class was a learning experience…I learned that I am not too good at budgeting my time for reading and preparing for tests, I left it to the end. I know now how I will be towards other internet classes and prepare for them.
81	No.
82	Great class!!!
83	I loved taking this web class. The professor was awesome and very understanding.
85	N/A
86	The questions on the exams were very detailed but by being able to use the book it helped.
87	No.
88	No.
89	I really did not like the whole thing being on the web. I would have definitely done better if it were in a traditional class room.
90	Personally, I didn't like the web-based option for this class because it made me feel

	out of the loop with work and whatever else. I seemed kind of nervous all semester because I was never sure that I could count on the computer testing dates and things. I feel more comfortable also with a test in my hand. I think it would be good to have web-based lectures but in class tests.
91	I think this class was kinda hard when you are doing it on your own. The tests were very specific and hard to learn all the items necessary for the tests. A little more time could be used to take the test since they are so specific.
92	No.
93	I think that the processor should make it clear in the beginning of the class that taking the group tests and taking tests with materials is not allowed. It would have saved the big debate and discussion over the morality of the issue at hand. To say define the terms of cheating with an online class would have solved any questions with student's methods of taking the test.
94	That's about it!
95	Dr. Adams, was very understanding to personal situations and allowed students to wait to finish the tests when they are capable of doing so. This allowed students to not have to stress over it because he was willing to help in every way he could.

APPENDIX I

End of the year comments Spring 03 Semester

1	Dr. Adams is very prompt on answering questions and is great about encouraging students to come see him if they have problems. The web-based class is great because we are learning the exact same material as we would be if we were in a classroom, only it helps out tremendously to do it on your own ANYTIME of the day!
2	I really feel I have gained a lot from taking this course and will recommend it to others. I plan to keep the textbook and study guide to use in my science classroom because I think it contains some really valuable information.
3	Great website! Great notes! I can tell that a lot of time and effort was put into this page!
4	Nothing.
5	I really liked the class.
6	I found all items provided for the course very useful. I don't understand why this decline occurred.
7	I though the web site was very complete and always had all the information I needed.
8	Nope.
9	I really enjoyed taking this class online, it was a good new experience for me. But I found it somewhat difficult to learn some things online. It was also very hard to make myself work online, and get online to study when there was nothing forcing me to do it (as there is with lecture). But, the streaming video and power points were amazing, and definitely helped a lot when I used them. I also used the study guide a lot, it was a big help. I definitely learned a lot from this course, probably the same amount I would have learned sitting in lecture. I just wish there would have been fewer tests, with larger time periods in which they were available to take.
10	I was very interested in this subject. I studied the book thoroughly and completed the study guide and studied that as well, but when I was taking the exam I felt like some of the information was not really put in layman's terms, it would be better if the exam was designed as the study guide and not necessarily work for word, but similar so you get what is expected. The content in the book actually inspired myself to think a lot more environmentally and also help me with some of my home gardening, it even helped me to decide if I don't like to teach to possible to into horticulture or something of that nature. Overall interesting subject, but would have liked more time to take the exam, also on that note looking at a computer is really different than looking at a test on paper, this was hard getting used to. Also, if the context was in simpler terms, I may have comprehended it better when taking an exam. Sometimes I felt I need to get the dictionary out, but then again didn't have time to do that because I was always short on time.
11	There needs to be an investigation into why some computers can get the voice over power presentation notes during the first two lessons and then after that,

	there is not any sound coming from the presentation. I started off listening to the voice over and listening to the streaming video and that helped reinforce the ideas and I did my best on the first exam. After that I could not access the voice over and was limited to the streaming video which helped me anyway. Thanks.
12	The pace of this class was very good. The only think that I would change is to make a meeting time for the class once during the year to allow more interaction between classmates.
13	Nope. ☺
14	No.
15	Dr. Clark Adams was an excellent teacher!
16	I thought this was a good experience. I would take another online class.
17	I have learned that computers are not as dependable as I once thought they were.
18	I really enjoyed the class being taught this way. It was SO convenient. However, I would not like to take everyone of my classes this way – I don't think all classes would work like this (ex: math) Also, Dr. Adams did a really nice job of making the lectures interesting – he talked about himself and his own experiences which made it feel like I had that interaction with my professor. I would definitely recommend this class to other students.
19	When the teacher would show or suggest web addresses, the people watching the video were unable to read the website address. IT would be nice to have the website addresses for each place he visits, included in the lecture notes.
20	The class is well organized and there were many materials available. I thought professor Adams did a great job. I would however not take another internet class. It just isn't for me. I think I need to go to class and have interactions with the professor and other students as well.
21	Nope.
22	I really like the way there is a full week usually to complete one test. This gives us the opportunity and chance to take it as soon as we feel we are ready.
23	I loved the freedom it gave me to complete the exams and surveys.
24	I feel that I learned a lot and would be willing to take another class like this one even by the same professor.
27	I am not a fan of the web-based class. I feel like I was not well informed beforehand that I would be enrolling in a web-based class. I do not remember the booklet which lists all of the classes telling me that I would be enrolling in a web-based class, because if I would have known beforehand I most likely would not have signed up for the class. I prefer an interactive class over the web-based class. I constantly felt like I was missing a deadline for taking a test and was always worried that I was missing something important. I felt like the first day of class was very rushed and confusing and I did not feel confident leaving that classroom knowing that I would be on my own for the rest of the semester. I realize that the professor made himself available to the class for questions and was very willing to work with you if you were having trouble with the material, but I feel as though I missed out on the interaction with other students and learning the extra little tidbits that the professors will add in during their lectures. So basically, I am opposed to the internet class.
28	I liked it but I personally have difficulty pacing myself. I would think I would LOVE

	that I can watch the lectures whenever I want. But instead, I'd procrastinate and not use them until the last minute.
29	I think you did a great job setting this all up. You seem to be a neat guy.
30	I think that I do better in a traditional class because I actually attend them. With the web-ct classes you have to have self-discipline. I think that I do better in a traditional class.
31	I wish I would have figured out earlier on the semester that when a question was worth more than one pint, it was because there was more than one answer, not just to plug in one answer…ugh!...otherwise, I learned with immediate feedback on exams…good luck to future students!!!
32	No.
33	I felt like I never interacted with the teacher. He was available, but not as available as a normal classroom teacher would be.
34	Can not think of anything.
35	I really enjoyed the class. I would have liked to actually attend lecture because I was interested in discussing information we learned more thoroughly. I did not take time to email Dr. Adams about issues I would have discussed with him after lectures.
36	I think the material covered was very well done by the web ct program. The only reason I wouldn't want to take another web class is because I am one of those who puts off the studying until right before because I get to busy or forget about the test. The resources were amazing for this class, there is no reason anyone should do really poorly in this class!
37	This was an amazing way to hold class. I very much so appreciate that I could "attend" class on my time. Also, the multiple ways to watch the classes that were offered was outstanding. I only utilized the streaming video but was aware of my other options. I believe the testing was effective and well scheduled. All classes should be held this way as more people would be able to take them. The only problems I had were with the sound on the videos being inconsistent. Otherwise, THANK YOU and GREAT JOB!!!
38	I didn't sign up for a computer based class, and did not have the opportunity to drop a mandatory class to better fit my needs. I prefer to sit in a traditional classroom where I can at least be able to see the professor on a daily basis and not have to ask all questions about the class via email.
39	The questions on the exams were EXTREMELY difficult and almost unfair.
40	No.
41	No.
42	Very interesting.
43	N/A
44	The website was not working efficiently during the first test that I took. It would not let me submit my answers and when the site began working again my time was up and I was unable to answer the last 10 or so questions. I thought this was ridiculous for a class that is treated like any other lecture class to have testing that did not work properly. I had no further problems after this first test, but this one problem will prevent me from taking another web-based class.
45	Some of the questions on the test seemed to come from no where. I searched and searched and the answers were no where to be found. I don't know how we

	were expected to know the answers to questions that were no in the book, study guide or lectures.
46	First of all, I have never considered myself an "environmentalist." I didn't have very high expectations for this class because it was more of a requirement than in interesting elective. However, I did appreciate its focus on education. My feelings about this course have completely skyrocketed throughout this semester. I now can proudly say that as a senior with over 120 hours of course credit in college, this course is my favorite one that I have taken. It has influenced me to an amazing degree and I have found myself pondering the issues of this course wherever I go and talking to friends and family about it. While some of my feelings about the environment and politics may not have flipped over because of this class, I am sure I will never see our world the same way again. It has inspired me to read books on all sides of the subject. I am currently reading Carson's Silent Spring even though this is hardly the first time a course has mentioned this book, it is the first time I really understood why I should. I would definitely take another course like this one if I could. Dr. Adams was always accessible, the materials were interesting, and the inspiration was abundant. This is how college courses should always be.
47	I had a bad experience with web based course. I will avoid web based courses in the future.
48	No.
49	I enjoyed this class, it was well organized.
50	No.
52	I felt that at times the questions on the tests were not worded correctly, and when I brought up some of these questions, I was told that I was mistaken. Though you could find the answer in the book.
53	The format of the cd's was only readable on Real Player which all networks on campus to not support. A suggestion would be to provide cd's in various formats (ie Window Media Player) to ensure easier access to all students. Also, I was never able to successfully access the power point notes online and am still not really sure why. In general, I thoroughly enjoyed taking this course. The instructor's enthusiasm was uplifting! The lessons enjoyable! Based on my experience in this class, I would definitely take another web based course. It fit easily into my hectic schedule. One more side note: I found the student discussion board rather disappointing – filled primarily with comments about technical difficulties in test taking. Perhaps a portion of the grade for the class could be based on "meaningful discussion" on the website. Maybe this would encourage more engaged group of students.
54	It's not what I expected. The tests were pretty tough and I thought that I was pretty prepared for the test. There was information on there that was not presented on the web or in the lectures.
55	Nope!
56	I think just the number of tests need to be reduced, or maybe have quizzes and tests just to break up the cramming of information.
57	I liked that I could to at my won pace and could do the class at my convenience.
58	No.
59	Overall, I think the web-based course is a great idea, because at times it was very

	convenient to be able to study and do my work at odd hours. However, it was frustrating when I felt like I was wasting time waiting for pages to load, and I get very tired of sitting in front of my computer for so long. Also, I found the wording of some of the test questions to be very confusing, and was frustrated that I couldn't do better on them than I did.
60	Overall, I enjoyed having a web-based course. It was very convenient, yet I feel like I learned a lot!
61	I really enjoyed the topics that were taught and I really liked that it was an online class. I wish that there were more online classes offered online. Unfortunately, this is probably my only online class that I will get to take.
62	In lectures, etc. in traditional style classes, there is more interaction with the student and teacher because they can ask questions, etc. I do wish we could have had more of that with this course.
63	No.
64	No.
65	No thanks.
66	I did not enjoy this class that much simply because I lack self discipline.
67	Reiterating my answer to question 22, the tests were rushed. Most of my incorrect answers were due to clicking a button just to answer the questions. My scores were not representative of my knowledge. The web classroom is so convenient, but was hardly used as it was the most intimidating amount of information presented in 400 different ways. I wish he would just simplify it or narrow it down a little!
68	No.
70	Nope.
71	A more abundant supply on study guides should be ordered, because I was not able to retrieve one and I think it affected my performance. The few exercises put on the power point presentations helped a great deal!
72	I thought the class was great. I really learned more than I could imagine. There were some test questions that I did not feel were covered, but because I did have the materials at my disposal, I felt unable to say much. Multiple answer questions did keep me from receiving at least 10 points toward my grade.
73	The grading system was a little confusing. On our grades page, it appeared that our grad was the one given, yet it was the percentages that were our actual grades. I did not find out until late semester, so this was very alarming and dropped what I thought was my grade a whole letter which was discouraging. The grades listed should be percentages already calculated to avoid confusion. Also, there is so many different things to study and learn the material, which is diverse and helps students choose what studying material would be best for them to learn. But, it was almost intimidating and hard to choose and know which of these things to study for the test from: the textbook, web lectures, online practice quizzes, study guides, etc. This was slightly overwhelming and it was difficult t know which area the test material was based on. Knowledge of that would be beneficial and save a lot of unnecessary time trying to study all the different materials. Overall, the web class was convenient and I enjoyed this alternative to traditional classroom teaching.
74	I just feel that there should be either a way to help us prepare for the tests better

	or easier tests. OR maybe even some quizzes or something to help our grade, when we don't do so well on the tests.
75	This was my first time taking a web based class. I found it a great way to learn. It forces the student to seek out information. I learned a lot from this class and look forward to taking more like it. Additionally, it is very convenient because a student can do the coursework around their schedule. I learned more from this course than from many of my traditional class based courses.
76	I enjoyed the material. A lot of it is basic knowledge that all science teachers and educators should know and understand.
77	I learned a lot about teaching, the environment, and examples to use when I one day teach such material. Thanks Dr. Adams!
78	Dr. Adams was very helpful and readily available while we took our tests online if we had any questions. This was my first time to use the web ct and I plan in taking more classes in the future because I liked it so much!
79	Wish that my grades would have reflected more on the amount of time spent reading each chapter and doing each study guide…and studying!
80	Nope.
81	No.
82	Nope.
83	It was a great class. The professor was always willing to help out. It was paced out very well so everything was not crammed into one thing.
84	It was quite a bit of work, but that is expected for a college level course.
86	I MISS PEOPLE!! I like interactive classrooms. It would be a sad, sad world if all activity revolved around a computer – no matter how "convenient." I could tell Mr. Adams was very thorough and helpful in providing all possible sources we might need considering it was a web-based class. Don't you want to know who we are though??
87	No. I enjoyed the class. I felt the website was sometimes not very friendly to navigate around.
88	I really enjoyed taking a course from a professor that was knowledgeable about their students and the subject they were teaching. I feel like you have known students better than any professor I have taken. Thanks for being so real.
89	I really enjoyed this class and just wish that I had been able to devote more time to it.
90	Honestly this class is not difficult, but it is very hard to keep up and with six tests it is very hard to keep up. I almost felt that to much material was covered and there was never a review in order to possibly narrow down some of the information.
91	I thought it was a good class and I really liked the web based format.
92	No.
93	Good job.
94	There needs to be prior warning before registration that the class is web based and it needs to be blatantly obvious. It was an unpleasant surprise and shock for me to walk in the first day and find out that I would not be seeing my professor at all during the semester and everything would be web based. Offering the course web based is fine, but students should understand that going in, and be able to make the choice of whether they want to take a course completely on the web prior to signing up for the course.

95	Nothing.
96	I have horrible time management. I had problems making myself do the work. That's the only reason I wouldn't take another web based course.
97	I feel like I've learned a lot from this class. I feel better prepared to teach science concepts and I feel like I truly have a better attitude towards the way I treat the environment. I enjoyed the class, but I wish it wouldn't have been on the internet.
98	Overall, I enjoyed having the freedom of watching the lectures when I had the free time. It made me feel more comfortable with taking the class.
99	No.
100	I am an A/B student and I received a C in the class. I account it towards the fact that there wasn't' a classroom lecture on campus, during the time allotted. I wish that Dr. Adams still held classes even though the lessons were available on TV. My home computer was not equipped for the lessons and I do not have cable TV. Going on campus was more inconvenient than attending a classroom (I have an evening job). The one lesson that I was able to watch was enjoyable and made me wish that I had a better chance for seeing the rest. I highly recommend bringing back the classroom lectures so that students like myself can receive a better change at succeeding.
101	No.
102	I think that this was a great course. I learned a lot and had a good time while doing it. This class offered a lot of options to teach the material and it was very convenient. If I could take this class over again, I would.
103	Not really.
104	I am glad that I chose to take this web based class. IT has been very convenient and I have been allowed to move at my own pace. Dr. Adams was always there to answer questions and provide help.
105	I enjoyed the simple format – it really made it easier for me to graduate.
106	No.
107	I felt completely disconnected from the actual classroom and other students. I wish there had been an online message board / chat room that we could have used to discuss any questions we might have had over the lectures.
108	The video lectures were a lot of help too.
109	This class was better for me, because I study at weird hours.
110	I enjoyed the flexibility web base courses offer students with full schedules and outside responsibilities!
111	Some of the multi question questions are hard to understand. I like the class and was really interested in the material.
112	I thought that this class was a very interesting class. I learned more in this class than my environmental science AP course in high school. I liked the streaming video the most because I was able to see my professor and follow along with him during the lectures.
113	I enjoyed Dr. Adams video lectures. He was cute talking about how to conserver the environment and its resources. You could tell he really believed in what he was teaching.

APPENDIX J

October 8, 2002

MEMORANDUM

TO: Clark E. Adams
WFSC
MS 2258

SUBJECT: Empowering Elementary Teachers in Texas to Prepare Their Students for the Schience Section of the Texas Assessment of Knowledge and Skills(TAKS) 2003 2002-491

Approval Date: October 8, 2002 to October 7, 2003

The Institutional Review Board – Human Subjects in Research, Texas A&M University has reviewed and approved the above referenced protocol. Your study has been approved for one year. As the principal investigator of this study, you assume the following responsibilities:

Renewal: Your protocol must be re-approved each year in order to continue the research. You must also complete the proper renewal forms in order to continue the study after the initial approval period.

Adverse events: Any adverse events or reactions must be reported to the IRB immediately.

Amendments: Any changes to the protocol, such as procedures, consent/assent forms, addition of subjects, or study design must be reported to and approved by the IRB.

Informed Consent/Assent: All subjects should be given a copy of the consent document approved by the IRB for use in your study.

Completion: When the study is complete, you must notify the IRB office and complete the required forms.

Dr. E. Murl Bailey, Chair
Institutional Review Board –
Human Subjects in Research

VITA

Scott Alexander Blackmon

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Personal Information

Born: April 25, 1980, Fort Worth, Texas

Educational Background:

2002 – 2003	Texas A&M University College Station, Texas Major: Wildlife and Fisheries Sciences Degree: M.S. , 2003
1997 – 2002	Texas A&M University College Station, Texas Major: Agricultural Development Degree: B.S. , 2002

Professional Experience:

2002 – 2003	Graduate Research Assistant Dept. of Wildlife and Fisheries Sciences Texas A&M University College Station, Texas
2001 – 2002	Technical Administrator & Designer Dept. of Wildlife and Fisheries Sciences Texas A&M University College Station, Texas
2001 – 2002	Technology Mentor Fellowship Program Dept. of Education Texas A&M University College Station, Texas

Academic Achievements:

Phi Theta Kappa Honor Society

Gamma Sigma Delta Honor Society